

## Redescription of *Geogarypus minor*, type species of the genus *Geogarypus*, and description of a new species from Italy (Pseudoscorpiones: Geogarypidae)

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**Abstract.** The type species of the pseudoscorpion genus *Geogarypus* Chamberlin, 1930, *Geogarypus minor* (L. Koch, 1873), is redescribed from the newly designated female lectotype and numerous specimens from southern France, Corsica and Italy. *Geogarypus nigriunauus* (Simon, 1879) is newly designated as a junior subjective synonym of *G. minor*, and a new species, *G. italicus* sp. nov. (type locality Bergeggi, Western Liguria, Italy), is described from specimens from mainland Italy, Sicily and Sardinia. A key to the Mediterraneo-Macaronesian species of the genus is proposed.

**Keywords:** New species, new synonymy, type species, lectotype, Mediterraneo-Macaronesian area, *Geogarypus*

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The pseudoscorpion family Geogarypidae is widely distributed around the world and currently contains three genera: *Geogarypus* Chamberlin, 1930, *Afrogarypus* Beier, 1931 and *Indogarypus* Beier, 1957 (Harvey 1986, 1992). Diagnostic characters of these genera, reported in Harvey (1986), are the absence of a sulcus on pedipalpal chela and the presence of accessory teeth on fixed chelal finger in *Geogarypus* (however *G. mirei* Heurtault, 1970 lacks accessory teeth), the presence of a dorsal sulcus and the absence of accessory teeth in *Afrogarypus*, and the presence of both an interno-lateral sulcus and accessory teeth in *Indogarypus*. The relationships among Geogarypidae and other families of Garypoidea are subsequently discussed in Harvey (1992).

The pseudoscorpion genus *Geogarypus* was established by Chamberlin (1930), and includes 45 extant and three fossil nominal species. The genus is widely distributed in most temperate and tropical regions of the world, and is only noticeably absent from the Nearctic Region (Harvey 2013; Batuwita & Benjamin 2014; Nassirkhani 2014). The fossil species are known only from Baltic and Rovno amber (Henderickx & Perkovsky 2012; Harvey 2013). Eight species are known from the Mediterraneo-Macaronesian area, of which only *Geogarypus minor* (L. Koch, 1873) and *G. uigrimanus* (Simon, 1879) are widely distributed in this area, with the others more localised (Harvey 2013).

The present work presents a modern redescription of *G. minor*, the type species of the genus, and the description of a new species of *Geogarypus* from Italy. A key to Mediterraneo-Macaronesian species of *Geogarypus* is also presented.

### METHODS

This study is based on the examination of 2,025 adult specimens and 466 nymphs of *Geogarypus*, lodged chiefly in the collection of the first author (GG, those without acronym in the text) and in the following institutions: Muséum d'Histoire naturelle, Geneva (MHNG), Muséum National d'Histoire Naturelle, Paris (MNHN), Museo Civico di Storia Naturale "G. Doria", Genoa (MSNG), Museo Civico di Storia Naturale, Verona (MSNV), Departamento de Biología Animal (Zoología), Universidad de La Laguna, Tenerife

(MZUL), Museo di Zoologia dell'Università degli Studi, Padua (MZUP), and Natural History Museum, London (NHM).

The specimens here referred to *G. minor* and *G. italicus* were compared with the following material:

**Material examined of *Geogarypus shulovi*.**—GREECE: *Dodecanese*: *Kōs*: 1 ♂, 2 ♀ with embryos, Lambi, garden and beach of Hotel Atlantis, 21–27 June 1993, F. Gasparo. **TURKEY**: *Mersin*: 1 ♀, 1 tritonymph, near Tönük, 380 m a.s.l., 8 July 1988, G. Gardini, R. Rizzerio & S. Zoia. *Isparta*: 1 ♀, Bademli, 16 July 1988, G. Gardini, R. Rizzerio & S. Zoia.

**Material examined of *Geogarypus mirei*.**—SPAIN: *Canary Islands*: *Gran Canaria*: 1 ♂, 1 ♀ (*G. mirei*, V. Mahnert det.), Maspalomas Dunas, aus trockenem Stengel, 9 December 2002, H.-P. Reike (MHNG).

**Material examined of *Geogarypus canariensis*.**—SPAIN: *Canary Islands*: *Tenerife*: 1 ♂, 1 ♀ (*G. canariensis*, V. Mahnert det.), Icod de los Vinos, 500 m a.s.l., 10 March 1974, T. Palm, *Laurus* (MHNG); 1 ♂, 1 ♀ (*G. canariensis*, V. Mahnert det.), Tenerife, 30 November 1977, Heiss (MHNG); 1 ♀ (*G. canariensis*, V. Mahnert det.), Cueva del Viento, 7 February 1981, J.L. Martin (MZUL); 1 ♂ (remains), 4 ♀ (*G. canariensis*, V. Mahnert det.), Aguamansa, 1100–1400 m a.s.l., 13–17 February 1982, K. Thaler (MHNG); 1 ♀ (*G. canariensis*, V. Mahnert det.), Monte del Agua, 22 December 1987, P. Oromí (MZUL); 1 ♀, Aguamansa, 7 May 1995, C. Canepari; 1 ♀ (*G. canariensis*, V. Mahnert det.), Cañadas, Risco Verde, 8 June 1995, N. Arechavaleta (MZUL); 1 ♀ (*G. canariensis*, P. Oromí det.), Cañadas, San Antonio, 25 May 1996, P. Oromí (MZUL); 1 ♂, 3 ♀ (*G. minor*, V. Mahnert det.), La Victoria, pine forest, 7 April 2001, G.B. Delgrado (MHNG).

**Material examined of *Geogarypus cf. canariensis*.**—SPAIN: *Canary Islands*: *Gran Canaria*: 1 ♂, 1 ♀ (*G. minor*, V. Mahnert det.), Buco Oscuro, 8 January 1988, P. Oromí (MHNG). *Lanzarote*: 1 ♂, 1 ♀ (*G. minor*, V. Mahnert det.), Mta. Clara, Caldera, termizado, 25–28 February 2002, Giet (MHNG); 1 ♂, 1 ♀ (*G. canariensis*, V. Mahnert det.), Valle do Temisa, MSS, 13 January 2007, M. Egoz (MZUL).

Specimens were cleared in 10% KOH solution at 40°C for several hours, washed in distilled water and temporarily mounted—after dissection of right palp, chelicera, legs I and



Figures 1–2.—1, *Geogarypus minor* (L. Koch, 1873), female lectotype from Corsica (NHM); 2, *Geogarypus italicus* sp. nov., male holotype from Bergeggi, Liguria (MHNG) (Phot. C. Giusto). Scale line : 1 mm.

IV—in cavity slides with 60% lactic acid. Each specimen was rinsed, after study, in distilled water and returned to a vial of 70% ethanol together with the dissected portions in glass capillary tubes. All specimens were studied using an Olympus BHB compound microscope; drawings were made with the aid of a Nachet drawing tube. Measurements (expressed in mm) and proportions are given as length/breadth for carapace, chelicerae and pedipalps and as length/depth for legs; depth was also measured for the palpal chela. Terminology and reference points for measurements largely follow Chamberlin (1931), and the terminology of trichobothria and cheliceral setae also follow Harvey (1986, 1992); the use of the terms antiaxial and paraxial follows Judson (2007).

Synonymies are supplied in the case of changes relative to the catalogue of Harvey (2013), as a consequence of revised identifications. The Italian regions are listed in the order from N to S, followed by Sicily and Sardinia. As regards Sardinia,

its administrative division into four Provinces (Sassari, Nuoro, Oristano, Cagliari) is followed, as used formally before 2005.

## SYSTEMATICS

Family Geogarypidae Chamberlin, 1930

Genus *Geogarypus* Chamberlin, 1930

*Geogarypus* Chamberlin 1930:609.

**Type species.**—*Garypus minor* L. Koch, 1873, by original designation.

*Geogarypus minor* (L. Koch, 1873)

<http://zoobank.org/NomenclaturalActs/urn:lsid:zoobank.org:aet:0954EDF3-4758-4A78-9793-9A4B1A49A655>

Figs 1, 3–24, 46–47, 54

*Garypus minor* L. Koch 1873:38; Ellingsen 1908:670 (Giglio Is., in part: see *G. italicus*).

*Garypus nigrimanus* Simon 1879:47, 312. **Syn. nov.**

*Garypus meridionalis* Canestrini 1885:n.7.

*Garypus nigrimanus* Simon: Simon 1898:21; Simon 1900:592; Gestro 1904:14 (Cagliari; Golfo Aranci, in part: see *G. italicus*).

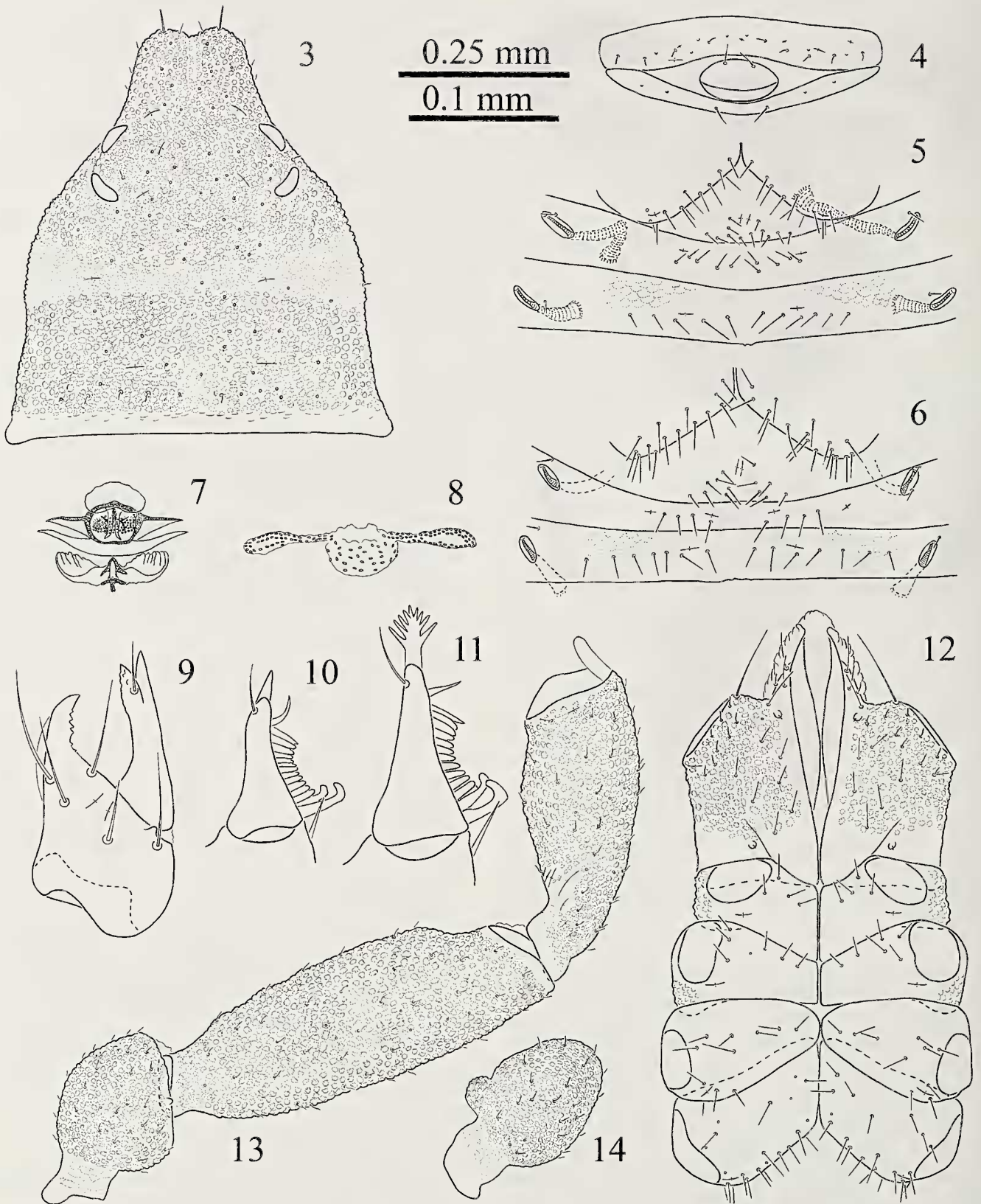
*Geogarypus nigrimanus* (Simon): Beier 1963a:259; Lazzeroni 1969:335 (Ginosa Marina; Ciminà, Antonimina, in part: see *G. italicus*); Callaini 1983:151; Callaini 1989:145 (Levanzo Is.); Gardini et al. 1997:223.

**Material examined.**—*Lectotype* of *Garypus minor*: FRANCE: ♀ (here designated), “Corsica / E. Simon” “BMNH 1913.9.1.449” “*Garypus minor* L. Koch / Syntype (?) ♀ / M. Judson det. 1992” (NHM).

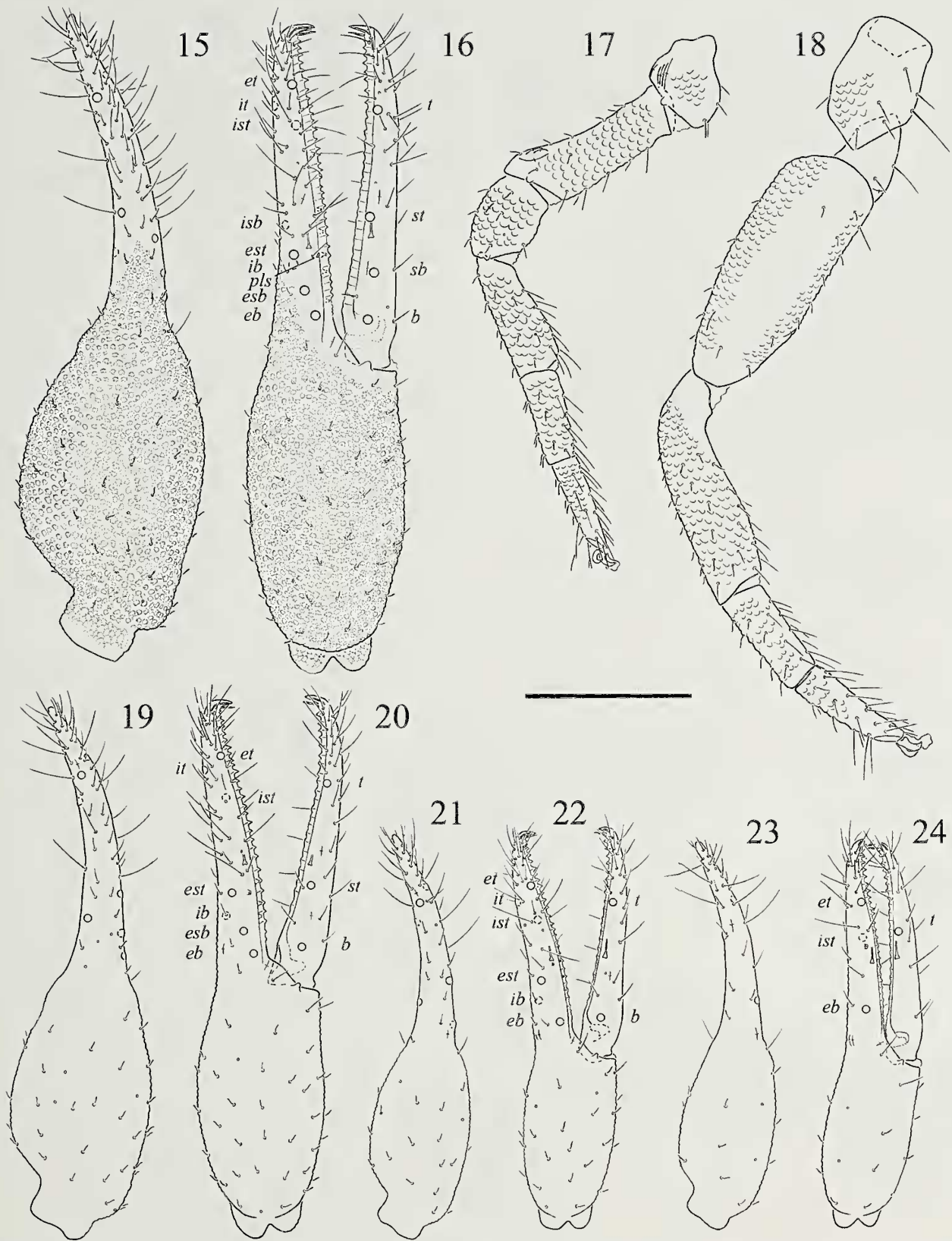
*Paralectotypes* (probable) of *Garypus minor*: FRANCE and ALGERIA: 5 ♂, 21 ♀ (mixture of probable paralectotypes and non-types, together with 1 ♀ of *Geogarypus* sp.), “2376, *G. minor* L.K., Corsica, Alg.” (MNHN).

*Syntypes* of *Garypus nigrimanus*: FRANCE: 5 ♂, 15 ♀ (syntypes mixed with non-type specimens), “2362, *G. nigrimanus* E.S., Gallia <sup>m</sup> Corsica”, “St Martin Vesubie, A. Gr[ouville]. 1911” (MNHN).

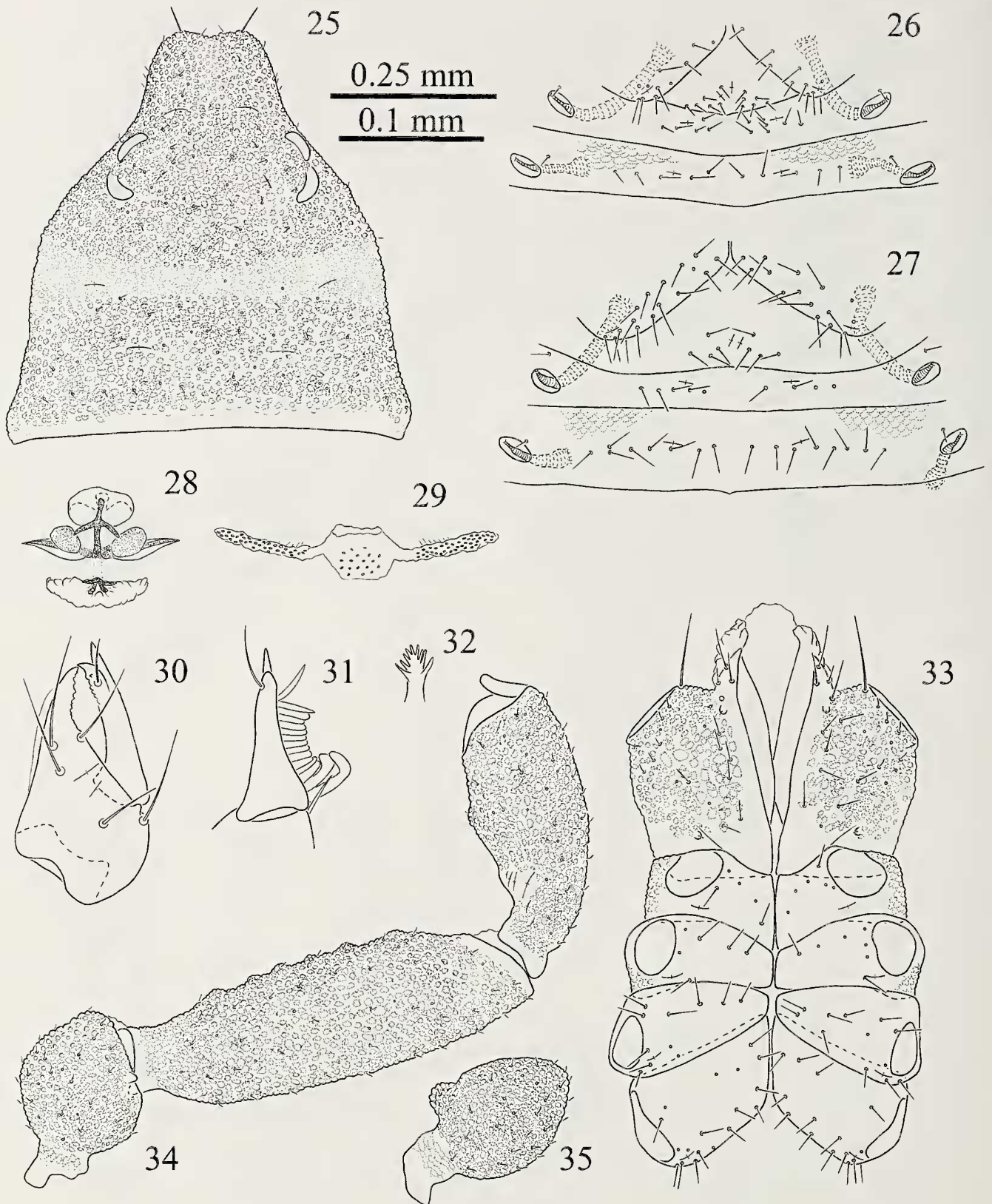
*Other material*: FRANCE: *Pyrénées Orientales*: 1 ♂, 1 ♀, Perpignan, Salses, 30 April 1967, G. Osella (MSNV). *Hérault*: 1 tritonymph, Montpellier, Clapiers, 80 m a.s.l., 30 April 2015, G. Gardini, leaf litter garigue; 1 tritonymph (*G. nigrimanus*, V. Mahnert det.), Frontignan, Montagne de la Gardiole, 24 July 1977, P. Haymoz (MHNG). *Gard*: 1 deutonymph (*G. nigrimanus*, V. Mahnert det.), Ussel, 26 July 1980, F. Baud, wood (MHNG). *Bouches du Rhône*: 1 ♀ (*G. minor*, V. Mahnert det.), Martigue, 16 September 1978, V. Mahnert, leaf litter in town (MHNG). *Vauchuse*: 1 ♀ (*G. minor*, V. Mahnert det.), Montagne du Luberon, Cucuron, 2 August 1975, P. Haymoz (MHNG); 1 ♂ (*G. minor*, V. Mahnert det.), Montagne du Luberon, Vitrolles, 2 August 1975, P. Haymoz (MHNG). *Var*: 1 ♂, 1 ♀, Hyères, Villa Noailles, 116 m a.s.l., 5 April 2015, G. Gardini, under *Pistacia lentiscus*; 4 ♂, 1 tritonymph, Hyères, Île de Porquerolles, 10–50 m a.s.l., 19 May 2013, G. Gardini, C. Giusto & S. Zoia; 16 ♂, 19 ♀, 1 tritonymph, Hyères, Île de Bagaud, 9 December 2011, P. Ponel, *Quercus ilex* wood; 14 ♂, 24 ♀, Hyères, Île de Bagaud, 9 December 2011, P. Ponel, under *Pistacia lentiscus*; 8 ♂, 11 ♀,



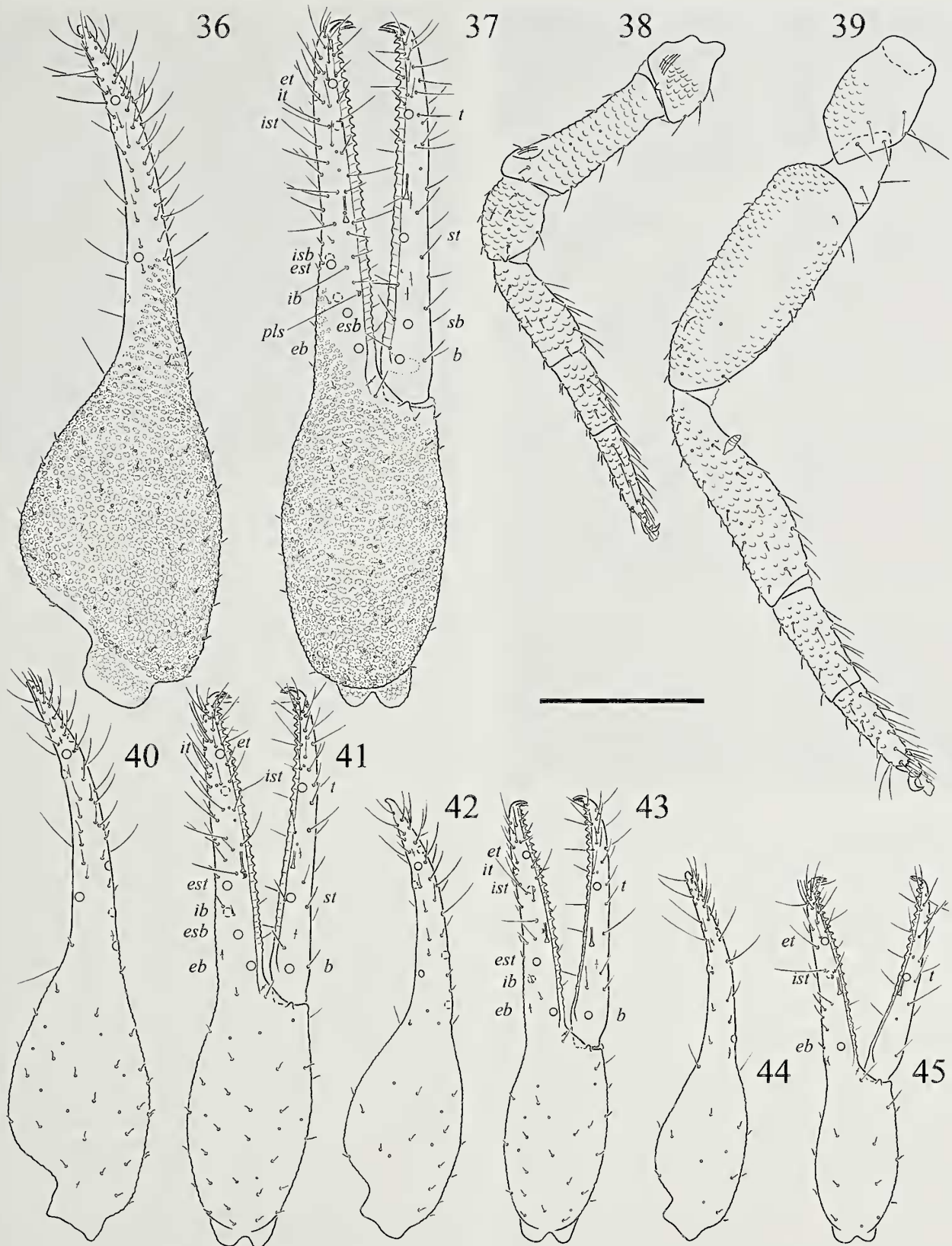
Figures 3-14.—*Geogarypus minor* (L. Koch, 1873), male from Finale Ligure, Caprazoppa (7 October 1975), unless stated otherwise. 3, Carapace, dorsal; 4, Tergites and sternites XI-XII, posterior; 5, Sternites II-IV; 6, Sternites II-IV, female; 7, Genitalia, ventral; 8, Genitalia, ventral, female; 9, Chelicera, dorsal; 10, Movable finger with galea, rallum and serrula exterior, lateral; 11, Movable finger with galea, rallum and serrula exterior, lateral, female; 12, Coxal area, ventral; 13, Right trochanter, femur and patella, dorsal; 14, Right trochanter, lateral. Scale lines: 0.25 mm (Figs. 3-8, 12-14), 0.1 mm (Figs. 9-11).



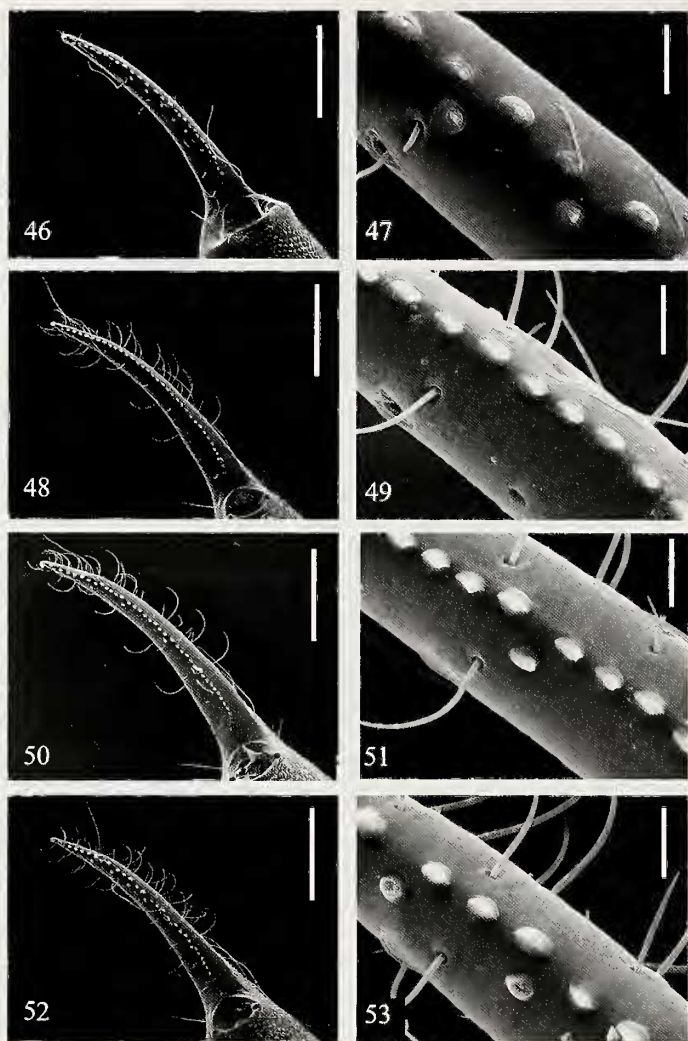
Figures 15–24.—*Geogarypus minor* (L. Koch, 1873), male from Finale Ligure, Caprazoppa (7 October 1975), unless stated otherwise. 15, Right chela, dorsal; 16, Right chela, lateral; 17, Right leg I, lateral; 18, Right leg IV, lateral. 19, Right chela, dorsal (granulation omitted), tritonymph; 20, Right chela, lateral (granulation omitted), tritonymph; 21, Right chela, dorsal (granulation omitted), deutonymph; 22, Right chela, lateral (granulation omitted), deutonymph; 23, Right chela, dorsal, protonymph from Caronia, Mt. Pagano (granulation omitted); 24, Right chela, lateral, protonymph from Caronia, Mt. Pagano (granulation omitted). Scale line: 0.25 mm.



Figures 25–35.—*Geogarypus italicus* sp. nov., male paratype from Bergeggi (30 July 2007), unless stated otherwise. 25, Carapace, dorsal; 26, Sternites II–IV; 27, Sternites II–IV, female paratype from Bergeggi (30 July 2007); 28, Genitalia, ventral; 29, Genitalia, ventral, female paratype from Bergeggi (30 July 2007); 30, Chelicera, dorsal; 31, Movable finger with galea, rallum and serrula exterior, lateral; 32, Galea, female paratype from Bergeggi (30 July 2007); 33, Coxal area, ventral; 34, Right trochanter, femur and patella, dorsal; 35, Right trochanter, lateral. Scale lines: 0.25 mm (Figs. 25–29, 33–35), 0.1 mm (Figs. 30–32).



Figures 36–45.—*Geogarypus italicus* sp. nov., male paratype from Bergeggi (30 July 2007), unless state otherwise. 36, Right chela, dorsal; 37, Right chela, lateral; 38, Right leg I, lateral; 39, Right leg IV, lateral [with *Amphoromorpha* sp. (Zygomycota) on tibia]; 40, Right chela, dorsal (granulation omitted), tritonymph paratype from Bergeggi (30 July 2007); 41, Right chela, lateral (granulation omitted), tritonymph paratype from Bergeggi (30 July 2007); 42, Right chela, dorsal (granulation omitted), deutonymph paratype from Bergeggi (30 July 2007); 43, Right chela, lateral (granulation omitted), deutonymph paratype from Bergeggi (30 July 2007); 44, Right chela, dorsal (granulation omitted), protonymph paratype from Bergeggi (30 July 2007); 45, Right chela, lateral (granulation omitted), protonymph paratype from Bergeggi (30 July 2007). Scale line: 0.25 mm.



Figures 46–53.—Dentition of left chelal finger (♀) and detail at level of trichobothrium *ist*, ventral view. 46, 47, *Geogarypus minor* (L. Koch, 1873) from Finale Ligure, Caprazoppa (7 October 1975); 48, 49, *G. italicus* sp. nov., paratype from Bergoglio (15 October 2007); 50, 51, *G. italicus* sp. nov. from Popoli, Capo Pescara (20 November 1991); 52, 53, *G. canariensis* (Tullgren, 1900) from Tenerife, Orotava, Aguamansa (13/17 February 1982). Scale line 200µm and 20µm for full vision and detail, respectively.

1 tritonymph, Hyères, Île de Bagaud, 13 December 2012, P. Ponel, under *Myrtus communis*; 7 ♂, 3 ♀, Hyères, Île de Bagaud, 13 December 2012, P. Ponel, under *Pistacia lentiscus*; 1 ♂, 1 ♀, Ramatuelle, Plage de l'Escalet, 20 May 2013, G. Gardini, C. Giusto & S. Zoia; 1 ♀, Signes, Plateau de Siou Blanc, 640 m a.s.l., 20 May 2013, G. Gardini, C. Giusto & S. Zoia. *Alpes Maritimes*: 3 ♂, 7 ♀ (*G. nigrimanus*, E. Simon det.), near Nice, February 1901, A. Dodero (MSNG). *Corse*: 1 ♀, Aleria, near Frassiccia, 27 April 2001, R. Poggi (MSNG); 3 ♂, 3 ♀, Lugo di Nazza, near Pinzalone, 150 m a.s.l., 20 May 2002, R. Poggi (MSNG); 1 ♀ (*G. nigrimanus*, G. Callaini det.), Bastia, Pineto, 2 August 1978, A. Sette (MSNV); 1 deutonymph, St-Florent, Quercialba, 21 April 1992, M. Bodon; 1 ♂ (*G. nigrimanus*, G. Callaini det.), Desert Agriates, Baccialu, 29 May 1979, R. Poggi, leaf litter *Erica* sp. (MSNG); 1 ♀ (*G. nigrimanus*, V. Mahnert det.), Cauria, Dolmen (Bosquet), 24

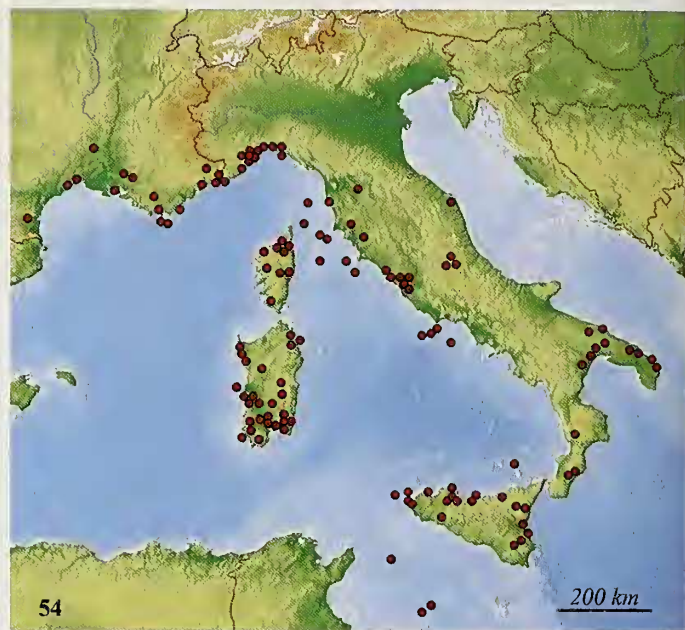


Figure 54.—Map depicting known distribution of *Geogarypus minor* (L. Koch, 1873) from southern France, Corsica and Italy.

April 1973, S. Vit (MHNG); 1 ♀ (*G. minor*, V. Mahnert det.), Oletta, St-François, 6 July 1974, I. Löbl (MHNG); 1 ♂, 1 ♀ (*G. minor*, V. Mahnert det.), Guagno-Les-Bain, 17 July 1974, I. Löbl (MHNG); 1 ♂, Calvi, Forêt de Bofinatu, 800 m a.s.l., 30 April 2001, B. Knoflach & K. Thaler (MHNG).

**ITALY:** *Liguria: Imperia Prov.*: 1 ♂, Ventimiglia, Grimaldi, 10 January 1975, G. Gardini, under stone near the sea; 1 ♂, 1 ♀, 1 tritonymph, Ventimiglia, Mortola Inferiore, 9 January 1975, G. Gardini, soil near the sea; 1 ♂, Ventimiglia, Mortola Inferiore, Villa Hanbury, 9 January 1975, G. Gardini, under bark of *Pinus halepensis*; 1 ♂, 1 tritonymph, Ventimiglia, Mortola Superiore, 150 m a.s.l., 16 May 1976, R. Poggi, under *Pistacia lentiscus*; 8 ♂, 5 ♀, 1 tritonymph, Ventimiglia, Mortola Superiore, 30 March 1976, G. Gardini, under *Pistacia lentiscus*; 1 ♀ (together with 1 ♂ of *G. italicus*), Ventimiglia, Torri, Val Bevera, 60 m a.s.l., 31 March 2008, R. Poggi (MSNG). *Liguria: Savona Prov.*: 1 ♀, Laigueglia, Capo Mele, 6 March 1973, G. Gardini, under *Pistacia lentiscus*; 1 ♀, Laigueglia, Capo Mele, 24 February 1974, G. Gardini, cliff; 1 ♂ (*G. nigrimanus*, G. Callaini det.), Laigueglia, Capo Mele, 230 m a.s.l., 10 July 1977, R. Poggi (MSNG); 2 tritonymphs, 1 deutonymph, Laigueglia, Capo Mele, 230 m a.s.l., 16 June 1984, R. Poggi, under *Cistus* (MSNG); 1 tritonymph (*G. nigrimanus*, G. Gardini det.), Laigueglia, Capo Mele, 11 May 1990, R. Poggi (MSNG); 2 ♂, 2 ♀ (*G. nigrimanus*, G. Gardini det.), Laigueglia, Capo Mele, 22 June 1990, R. Poggi, under *Pistacia lentiscus* (MSNG); 1 ♀ (*G. nigrimanus*, G. Gardini det.), Laigueglia, Capo Mele, 19 October 1990, R. Poggi (MSNG); 1 ♀ (*Garypus minor*, E. Simon det.), Albenga, 29 May 1900, A. Dodero (MSNG); 1 ♂, 1 ♀, 1 tritonymph, Toirano, Salto del Lupo, 183 m a.s.l., 5 July 2009, R. Poggi (MSNG); 1 ♀, Ceriale, Peagna, 10 November 1988, G. Gardini; 3 ♂, 3 ♀ (*Garypus nigrimanus*, E. Simon det.), Finale Ligure, Caprazoppa, 22 May 1899, A. Dodero (MSNG); 7 ♂, 11 ♀, Finale Ligure, Caprazoppa, 11 November 1973, G.

Bartoli, G. Gardini & R. Poggi, under *Euphorbia*; 2 ♂, 4 ♀, Finale Ligure, Caprazoppa, 10 December 1973, G. Bartoli, under *Cistus*; 3 ♂, 2 ♀, Finale Ligure, Caprazoppa, 10 March 1974, G. Gardini, sieved in garigue; 11 ♂, 12 ♀, 2 tritonymphs, 2 deutonymphs, Finale Ligure, Caprazoppa, 7 October 1975, R. Poggi, sieved under *Cistus* and *Euphorbia*; 1 ♂, 3 ♀, Finale Ligure, Caprazoppa, 21 November 1975, G. Bartoli; 2 ♂, 1 ♀, 1 tritonymph (*G. nigrimanus*, G. Callaini det.), Finale Ligure, Caprazoppa, 26 December 1977, G. Bartoli, sieved under *Cistus* and *Pistacia* (MSNG); 1 ♂, Finale Ligure, Caprazoppa, 29 October 1982, G. Gardini, under *Euphorbia*; 1 tritonymph, 1 deutonymph, Finale Ligure, Caprazoppa, 7 March 1985, C. Giusto; 4 ♂, 4 ♀, Finale Ligure, Caprazoppa, 220 m a.s.l., 14 November 1998, C. Giusto; 5 ♀, Finale Ligure, Caprazoppa, 190 m a.s.l., 44°09'50"N, 8°19'17"E, 18 December 2015, G. Gardini & A. Trotta, garigue; 1 ♂, 1 ♀, Finale Ligure, Caprazoppa, Cava di Rio Fine, 80 m a.s.l., 44°09'42.71"N, 8°19'29.81"E, 21 November 2015, G. Gardini, C. Giusto & A. Trotta, Mediterranean scrub; 1 deutonymph, Finale Ligure, Caprazoppa, Torre Colombara, 10 m a.s.l., 44°09'47.15"N, 8°20'13.36"E, 21 November 2015, G. Gardini, C. Giusto & A. Trotta, cliff, under *Limonium*; 2 ♀, Noli, Semaforo di Capo Noli, 4 April 1976, R. Poggi, under *Cistus*; 1 ♂, 1 ♀ (together with 2 ♀, 3 tritonymphs of *G. italicus*), Spotorno, 16 January 1977, G. Gardini, under *Pistacia*; 3 ♂, 1 tritonymph (together with 5 ♂, 5 ♀, 2 tritonymphs of *G. italicus*), Spotorno, Isola di Bergeggi, 7 May 2007, R. Poggi (MSNG). *Liguria: Genoa Prov.*: 1 ♀, Arenzano, Rio Cantarena, 500 m a.s.l., 20 November 1994, G. Gardini, sieved under *Quercus ilex*; 1 ♀, Genova, Sestri Ponente, Monte Gazzo, 410 m a.s.l., 23 November 2010, M. Capurro & S. Ferretti, *Quercus ilex* wood; 3 ♀ (*Garypus minor*, E. Simon det.), Sestri Ponente, Borzoli, Villa Doria, 1883, G. Doria (MSNG); 1 ♀, Genova, Santa Tecla, May 1901, G. Mantero (MSNG); 1 ♂, 2 ♀, 1 tritonymph (*G. minor*, M. Beier det.), Genova, San Rocco, September 1929, F. Capra (MSNG); 2 ♂, Genova, Forte Richelieu, 16 April 2001, S. Zoia; 2 ♂, Genova, Quinto al Mare, 25 January 1976, S. Riese, under bark of *Pinus*; 1 ♂, Genova, Quinto al Mare, Rio San Pietro, 70 m a.s.l., 18 October 2009, G. Gardini, hollow *Olea europaea*; 1 ♂, Genova, Quinto al Mare, Rio San Pietro, 50 m a.s.l., 29 March 2011, C. Giusto; 11 ♀, Genova, Quinto al Mare, slope S Monte Fasce, 520 m a.s.l., 20 May 2005, G. Gardini & A. Trotta, in brood nests; 1 ♀, Genova, Quinto al Mare, slope SE Monte Fasce, 200 m a.s.l., 14 March 2006, G. Gardini; 1 ♀, Genova, Quinto al Mare, 500 m a.s.l., 5 November 2006, G. Gardini & S. Zoia; 2 ♀, Genova, Quinto al Mare, slope W Monte Fasce, 500 m a.s.l., 7 April 2010, G. Gardini; 1 ♀, 1 deutonymph, Genova, Quinto al Mare, slope S Monte Fasce, 480 m a.s.l., 44°23'46"N, 9°01'46"E, 1 December 2015, G. Gardini, garigue; 1 ♂, 1 ♀, Genova, Quinto al Mare, slope Monte Moro, 150 m a.s.l., 24 September 2003, G. Gardini, *Quercus pubescens* wood; 1 ♀, Genova, Quinto al Mare, 100 m a.s.l., 15 February 2008, G. Gardini; 6 ♂, 1 tritonymph, Genova, Quinto al Mare, slope SW Monte Moro, 150 m a.s.l., 14 January 2007, G. Gardini, under *Arbutus unedo*; 5 ♀, Genova, Quinto al Mare, slope W Monte Moro, 150 m a.s.l., 5 March 2010, G. Gardini, in brood nests; 1 ♂ (together with 3 ♂ of *G. italicus*), Genova, Quinto al Mare, 240 m a.s.l.,

44°23'44"N, 9°01'24"E, 26 November 2015, G. Gardini, under *Arbutus unedo*; 1 ♂, Genova, Quinto al Mare, slope S Monte Moro, 110 m a.s.l., 44°23'24"N, 9°01'01"E, 4 December 2015, G. Gardini, sub *Arbutus* and *Myrtus*; 2 ♂, 1 tritonymph, Camogli, slope E Monte Toceo, 440 m a.s.l., 5 November 1998, G. Gardini, under *Calicotome* and *Euphorbia*; 4 ♂, 3 ♀, 7 tritonymphs, 1 deutonymph, Portofino, Punta Chiappa, 2 m a.s.l., 4 January 1984, C. Giusto, under *Limonium*. *Tuscany: Florence Prov.*: 1 ♀, Fiesole, 9 April 1984, G. Gardini & S. Zoia. *Tuscany: Livorno Prov.*: 1 ♀ (*Garypus minor*, E. Ellingsen det.), near Livorno, June 1908, A. Andreini (MSNG); 1 tritonymph (*Garypus minor*, E. Ellingsen det.), Isola di Gorgona, [no date], A. Andreini (MSNG); 1 ♂, Isola di Gorgona, settore settentrionale, 4 October 2016, R. Poggi (MSNG); 1 ♀, Isola di Capraia, 7 October 1974, G. Gardini, under *Pistacia*; 3 ♂, 1 ♀, Isola di Capraia, 12 September 1992, C. Bellò; 1 ♂, 1 ♀, Isola di Capraia, Capraia Isola, 1 October 1974, G. Gardini, under *Pistacia*; 1 ♂, 1 ♀, Isola di Capraia, Le Cote, Semaforo, 3 October 1974, G. Gardini under *Pistacia*; 1 ♂, Isola di Capraia, near Capraia Isola, 7 June 1993, S. Zoia; 1 ♂, 3 ♀, Isola d'Elba, Portoferraio, San Giovanni, 22 December 1975, G. Gardini, under bark of *Eucalyptus*; 1 tritonymph, Isola d'Elba, Rio nell'Elba, Nisporto, 23 August 1993, C. Giusto, under *Juniperus phoenicea*; 1 ♂, 1 ♀, Isola d'Elba, San Martino, Villa di Napoleone, 2 November 2007, G. Gardini; 3 ♀, Isola d'Elba, Capoliveri, Punta Buzzancone, 1 m a.s.l., 3 November 2007, G. Gardini, under *Phragmites*; 4 ♂, 5 ♀, Isola d'Elba, Capo d'Enfola, 100 m a.s.l., 3 October 2016, R. Poggi, sieved in Mediterranean shrub (MSNG); 1 ♀, Isola di Montecristo, Cala Maestra, 5 May 1976, R. Poggi, under *Cistus*; 1 ♀ (*G. nigrimanus*, G. Callaini det.), Isola di Montecristo, 10 June 1977, R. Poggi, under *Cistus monspeliensis* (MSNG); 1 ♀, Isola di Montecristo, 7 June 1989, R. Poggi (MSNG); 1 ♀, 1 tritonymph (*G. nigrimanus*, G. Callaini det.), Isola di Montecristo, Convento, 300 m a.s.l., 24 July 1980, R. Poggi, under *Cistus* (MSNG); 1 ♂, 2 ♀, 1 tritonymph (*G. nigrimanus*, G. Callaini det.), Isola di Montecristo, Belvedere, 12 May 1981, G. Osella, under *Cistus* (MSNV). *Tuscany: Grosseto Prov.*: 1 ♂ (*G. minor*, M. Beier det.), near Grosseto, Poggio Cavallo, March 1918, A. Andreini (MSNG); 1 ♂, near Massa Marittima, 7 April 1994, G. Gardini, *Quercus suber* wood; 9 ♂, 21 ♀ (*Garypus minor*, E. Ellingsen det.) (together with 9 ♂, 10 ♀, 2 tritonymphs of *G. italicus*), Isola del Giglio, [no date], G. Doria (MSNG); 1 ♂, 2 ♀ (*Garypus minor*, E. Ellingsen det.) (together with 2 ♀ of *G. italicus*), Isola del Giglio, November 1902, G. Doria (MSNG); 3 ♂, 3 ♀ (*Garypus minor*, E. Ellingsen det.), Isola del Giglio, February 1904, G. Doria (MSNG); 1 ♀, Isola del Giglio, il Franco, 18 July 2009, G. Caoduro; 2 ♂, 2 ♀, Isola di Giannutri, 20 May 1978, G. Gardini, *Quercus ilex* wood and garigue. *Marche: Ancona Prov.*: 1 ♂, 1 ♀, 2 tritonymphs, 2 deutonymphs, near Massignano, Pian di Raggetti, 350 m a.s.l., 16 June 2009, R. Poggi, *Quercus ilex* wood (MSNG). *Latium: Rome Prov.*: 56 ♂, 48 ♀, 2 tritonymphs and 146 further specimens (*Garypus minor*, E. Ellingsen det.), [Rome Province, 1907 or 1908, A. Rossi] (MSNG); 75 ♂, 45 ♀ (*Garypus minor*, E. Ellingsen det.), [Roma], Tre Fontane, 26 January 1908, [A. Rossi] (MSNG); 25 ♂, 22 ♀ (*Garypus minor*, E. Ellingsen det.), Roma, Viale Parioli, 2 February 1908, [A. Rossi] (MSNG); 1



♀ (*Garypus minor*, E. Ellingsen det.), [Tivoli], 4 October 1908, [A. Rossi] (MSNG); 12 ♂, 20 ♀ (*Garypus minor*, E. Ellingsen det.), [Sacrofano], Monte Musino, 12 April 1908, [A. Rossi] (MSNG); 4 ♀ (*Garypus minor*, E. Ellingsen det.), [Roma], Acquacetosa [Acqua Acetosa], 27 September 1908, [A. Rossi] (MSNG); 1 ♂, 1 ♀ (*Garypus minor*, G. Canestrini det.), "Roma-Emilia" [sic!], 1883 (MZUP); 1 ♂, 1 ♀ (*Garypus minor*, G. Canestrini det.), Roma, 1885 (MZUP); 1 ♂, 1 ♀ (remains) (*Garypus*, G. Canestrini det.), Roma, 1885 (MZUP); 1 ♀, Sasso di Furbara, 19 March 1969, P. Brignoli; 1 ♂, 2 ♀, Allumiere, Monte Tolfaccia, 25 April 1979, G. Gardini & S. Zoia; 2 ♂, 1 ♀, Allumiere, slope N Monte Tolfaccia, 300 m a.s.l., 22 September 1999, C. Giusto, on *Ononis* sp.; 1 ♂, 4 ♀, Castel di Guido, Oasi L.I.P.U., 3 October/4 November 2009, F. Bainsi, *Quercus cerris* and *Q. frainetto* wood; 1 ♀, Castel di Guido, Oasi L.I.P.U., 9 April 2010, F. Bainsi, *Quercus cerris* and *Q. frainetto* wood. *Latium: Latina Prov.:* 2 ♂, 4 ♀, Ponza, Isola di Ponza, 3 October 1990, G. Osella; 1 ♂, 1 ♀, 2 tritonymphs, Ponza, Isola di Ponza, Piana dell'Incenso, 4 October 1990, R. Poggi, under *Arbutus* (MSNG); 1 ♀, Ponza, Isola di Ponza, La Fornia, 100 m a.s.l., 9 April 2010, G. Ruzzante; 1 ♂, 1 ♀, Ponza, Isola di Zannone, 100 m a.s.l., 20 May 1987, R. Poggi (MSNG); 1 ♀, Ponza, Isola di Zannone, 9 October 1990, G. Osella; 1 ♂, 1 ♀, Ponza, Isola di Zannone, Capo Negro, 3 October 1990, R. Poggi (MSNG); 1 ♀, Ponza, Isola Palmarola, Porto, 2 October 1990, R. Poggi (MSNG); 3 ♀, Ponza, Isola Palmarola, valico per Vrieci, 2 October 1990, R. Poggi, under *Pistacia lentiscus* (MSNG); 3 ♂, 1 ♀, Ventotene, Isola Ventotene, Monte dell'Arco, 5 October 1990, R. Poggi (MSNG); 1 ♂, Ventotene, Isola Ventotene, Cala Rossano, 5 October 1990, R. Poggi (MSNG); 4 ♂, 6 ♀, Ventotene, Isola Ventotene, Punta degli Olivari, 50 m a.s.l., October 2010, G. Ruzzante. *Abruzzo: L'Aquila Prov.:* 1 ♀, Capo d'Aequa, 6 January 1994, G. Osella; 1 ♂, Rocca di Cambio, Altopiano delle Rocche, 1350 m a.s.l., 22 May 1994, G. Osella; 1 ♂, 4 ♀, Ofena, 550 m a.s.l., 20 November 1994, G. Osella. *Basilicata: Matera Prov.:* 2 ♂, 1 ♀, Policoro, 27 March 1988, F. Angelini; 4 ♂, 4 ♀, Policoro, 13 August 1989, F. Angelini. *Apulia: Bari Prov.:* 5 ♂, 3 ♀, 2 tritonymphs, Adelfia, 1.IV.1988, F. Angelini; 1 ♀, Monopoli, Impalata, 26 January 1997, G. Osella, *Quercus ilex* wood; 1 ♀, San Pietro Vernotico, Cerano, 7 September 1973, G. Gardini, *Quercus ilex* wood; 1 ♀, Mesagne, Bosco Preti, 2 December 1989, F. Angelini, *Quercus ilex* wood. *Apulia: Taranto Prov.:* 2 ♂, 1 ♀ (*G. minor*, M. Beier det.), Mottola, San Basilio, 1 November 1908, A. Andreini (MSNG); 1 ♀ (*G. minor*, M. Beier det.), id., 1 June 1909, A. Andreini (MSNG); 1 ♀ (*G. nigrimanus*, G. Lazzeroni det.), Taranto, Ginosa Marina, 24 September 1967, C. Baroni Urbani (MSNV); 1 ♂, Martina Franca, San Paolo, 300 m a.s.l., 2 May 2002, S. Zoia & F. Polese, hollow in *Olea europaea*. *Apulia: Lecce Prov.:* 3 ♂, 2 ♀, 1 tritonymph, 8 deutonymphs, San Cataldo, Frigole, 6 September 1973, G. Gardini; 1 ♀, San Cataldo, 15 October 1996, D. Ferreri; 1 ♀, Otranto, shore NW of Alimini Grande, 30 April 2002, S. Zoia & F. Polese. *Calabria: Catanzaro Prov.:* 1 ♀, Terme di Caronte, 3 December 1994, G. Osella. *Calabria: Reggio di Calabria Prov.:* 2 ♀ (*G. nigrimanus*, G. Lazzeroni det.) (together with 1 ♂, 1 ♀, 2 tritonymphs of *G. italicus*), Ciminà, 320 m a.s.l., 25 October 1966, G. Osella (MSNV); 2 ♂, 3 ♀ (*G. nigrimanus*, G. Lazzeroni det.) (together with 2 ♀ of *G.*

*italicus*), Antonimina, 350 m a.s.l., 26 October 1966, G. Osella (MSNV). *Sicily: Messina Prov.:* 2 tritonymphs (*G. nigrimanus*, G. Gardini det.), Caronia, slope Monte Pagano, 500 m a.s.l., September/November 1987, G. Sabella, mixed thermophilous wood; 1 ♀, 1 tritonymph, 1 protonymph (*G. nigrimanus*, G. Gardini det.), Caronia, slope Monte Pagano, 500 m a.s.l., July/August 1988, G. Sabella, mixed thermophilous wood; 1 ♂, 1 ♀, 1 tritonymph, 10 deutonymphs (*G. nigrimanus*, G. Gardini det.), Caronia, slope Monte Pagano, 350 m a.s.l., August/October 1987, G. Sabella, *Quercus suber* wood; 1 ♀, 4 tritonymphs, 4 deutonymphs (*G. nigrimanus*, G. Gardini det.), Caronia, slope Monte Pagano, 350 m a.s.l., July/October 1988, G. Sabella, *Quercus suber* wood; 1 ♀, Isola di Lipari, Quattropani, 370 m a.s.l., 10 September 1996, R. Poggi (MSNG). *Sicily: Palermo Prov.:* 1 ♂, 7 ♀, 1 tritonymph, Palermo, Orto Botanico, 4 October 1979, G. Gardini; 1 ♀, Palermo, Madonna dei Boschi, 14 June 1981, G. Gardini; 5 ♀ (together with 2 ♂, 2 ♀ of *G. italicus*), Palermo, slope Monte Busambra, 15 June 1981, G. Gardini; 11 ♂, 25 ♀, 2 tritonymphs, Godrano, 5 October 1979, G. Gardini, under bark *Eucalyptus*; 1 ♂, 1 ♀, 1 tritonymph, Godrano, Bosco della Ficuzza, 23 November 1974, Romano, under bark *Eucalyptus*; 1 ♀, Godrano, Bosco della Ficuzza, 26 November 1978, Romano, under bark *Eucalyptus*; 2 ♀, Godrano, Bosco della Ficuzza, 15 June 1981, G. Gardini; 1 ♀, Piana degli Albanesi, Maganoce, 19 November 1972, Romano; 25 ♂, 15 ♀, Cefalù, Castel di Tusa, 19 October 1976, G. Parodi, under stones; 1 deutonymph, Collesano, Piano Zucchi, 1050 m a.s.l., 31 May 1985, R. Rizzerio & S. Zoia, *Quercus ilex* wood. *Sicily: Trapani Prov.:* 1 ♀ (together with 1 ♂ of *G. italicus*), Scopello, Riserva Naturale dello Zingaro, 17 November 2001, B. Massa; 1 ♀, Scopello, Riserva Naturale dello Zingaro, 31 October 2001, B. Massa; 1 ♀, 2 tritonymphs (together with 1 ♀ of *G. italicus*), Scopello, Riserva Naturale dello Zingaro, 26 May 2002, B. Massa; 1 ♀ (together with 1 ♀ of *G. italicus*), Scopello, Riserva Naturale dello Zingaro, 30 June 2002, B. Massa; 1 ♀ (*G. nigrimanus*, G. Lazzeroni det.), Isola di Levanzo, October 1967, Riggio, Osella & Krapp (MSNV); 1 ♀, Isola di Levanzo, 15 September 1996, R. Poggi, with ants (MSNG); 3 ♂, 1 ♀, Isola di Levanzo, 15 September 1996, R. Poggi, under *Pistacia* (MSNG); 1 ♂, Isola di Favignana, 2 May 1981, G. Osella; 3 ♀, Isola di Favignana, 3 April 1990, S. Zoia; 4 ♀, Isola di Favignana, 27 April 1991, R. Poggi (MSNG); 1 ♀ (*G. Lazzeroni* det.), Isola di Favignana, Montagna Grossa, 19 March 1969, G. Osella (MSNV); 1 ♂, 1 ♀, Isola di Marettimo, il Passo, 4 May 1991, G. Osella; 1 ♀, Isola Grande dello Stagnone, 6 May 1991, G. Osella; 1 ♀, Isola di Pantelleria, Specchio di Venere, 8 December 1992, R. Poggi (MSNG). *Sicily: Catania Prov.:* 1 ♀ (*G. nigrimanus*, M. Beier det.), Catania, between Fiume Simeto and San Leonardo, 18 November 1961, M. La Greca (MSNV); 2 ♀, Randazzo, Piana di Randazzo, 29 April 1982, G. Gardini & R. Rizzerio; 1 ♀, Fiumefreddo, 14 November 1994, F. Di Franco, under *Arundo donax*. *Sicily: Agrigento Prov.:* 1 ♀ (*G. nigrimanus*, M. Beier det.), Sciacca, Monte Cronio, 26 November 1961, La Greca, Sichel & Alicata (MSNV); 1 ♂, Isola di Linosa, 29 April 1991, R. Poggi (MSNG); 1 ♀, Isola di Linosa, 1 December 1992, R. Poggi (MSNG); 3 ♂, 2 ♀, Isola di Lampione, 24 September 1996, R. Poggi, under *Atriplex* sp. (MSNG). *Sicily: Siracusa Prov.:* 3 ♀ (*G.*

*nigrimanus*, M. Beier det.), Ferla, 20/22 July 1969, L. Magnano (MSNV); 1 ♀ (*G. nigrimanus*, M. Beier det.), Bucecheri, 23 July 1969, L. Magnano (MSNV); 2 ♂, 1 ♀ (*G. nigrimanus*, M. Beier det.), near Melilli, 20/26 July 1969, L. Magnano (MSNV). *Sardinia: Sassari Prov.*: 1 ♂ (*Garypus nigrimanus*, E. Simon det.), Golfo Aranci, April 1902, A. Dodero (MSNG); 2 ♂, 2 ♀ (*Garypus nigrimanus*, E. Simon det.) (together with 1 ♂ of *G. italicus*), Golfo Aranci, April 1902, A. Dodero (MSNG); 1 ♀ (*Garypus nigrimanus*, E. Simon det.), Golfo Aranci, March 1903, A. Dodero (MSNG); 1 ♀ (*Garypus minor*, E. Ellingsen det.), Golfo Aranci, 1907, T. Derosas (MSNG); 1 ♂ (together with 1 ♀ of *G. italicus*), Golfo Aranci, 11 May 2000, R. Poggi; 1 deutonymph, Alghero, Punta La Speranza, 26 July 1975, S. Zoia; 1 ♀, Alghero, 10 km S from Alghero, 20 m a.s.l., 16 May 2003, R. Poggi (MSNG); 1 ♂, near Palmadula, 23 November 1991, R. Poggi, *Quercus ilex* wood (MSNG); 1 ♂, Loiri, Porto San Paolo, Vaccileddi, 100 m a.s.l., 17 April 2012, C. Torti, *Quercus ilex* wood; 2 ♂, 2 ♀, Isola Tavolara, 8 June 1989, G. Osella; 1 ♂, Isola Tavolara, 18 May 1994, G. Osella & M. Zuppa. *Sardinia: Oristano Prov.*: 4 ♂, 1 ♀, Isola Mal di Ventre, 15 June 1989, G. Osella; 6 ♂, 2 ♀, Cabras, Is Aruttas, 1 February 1995, C. Meloni, under *Pistacia lentiscus*; 1 ♀, Tharros, 22 March 1997, P. Leo; 1 ♂, 2 ♀, near Uras, October 1999, L. Fancello (MSNG); 2 ♂, 1 ♀, near Mogoro, October 1999, L. Fancello (MSNG); 1 ♂, 1 ♀, Arborea, 4 May 2000, R. Poggi, under algae and *Posidonia oceanica* (MSNG). *Sardinia: Nuoro Prov.*: 1 ♂ (*G. minor*, M. Beier det.), Macomer, April 1909, A. Dodero (MSNG); 2 ad. 2 juv., Seui, December 1999, L. Fancello (MSNG); 1 ♀, Gennargentu, Bruncu Spina, 1700–1800 m a.s.l., 4 May 1992, K. Thaler (MHNG). *Sardinia: Cagliari Prov.*: 5 ♂, 2 ♀, 1 tritonymph (*Garypus nigrimanus*, E. Simon det.), Cagliari, [no date], A. Dodero (MSNG); 1 ♂, 3 ♀, 1 tritonymph (*Garypus nigrimanus*, E. Simon det.), Cagliari, May 1902, A. Dodero (MSNG); 5 ♂, 3 ♀, Cagliari, Stagno di Molentargius, 20 September 1995, C. Meloni; 1 ♀, Quartu Sant'Elena, Capitana, September 1999, L. Fancello (MSNG); 2 ♂, 1 ♀, Elmas, 7 March 1979, P. Leo; 1 ♂, near Elmas, 26 February 1978, C. Meloni, under bark *Eucalyptus*; 1 ♀, Carbonia, Monte Sirai, 150 m a.s.l., 5 May 2000, R. Poggi (MSNG); 1 ♂, Chia, Porto Campana, January 2000, L. Fancello (MSNG); 1 ♂, 1 ♀, Costa Rei, Stagno Santa Giusta, October 1999, L. Fancello (MSNG); 5 ♂, 1 ♀, Decimomannu, 28 April 1995, C. Meloni, under *Olea europaea*; 5 ♂, 7 ♀, 7 tritonymphs, Gergei, December 1999, L. Fancello (MSNG); 2 ♀, Iglesias, Masua, January 2000, L. Fancello (MSNG); 1 ♀, Isola di Sant'Antioco, 11 May 1988, R. Argano; 1 ♂, 2 ♀, Isola di Sant'Antioco, Cala Lunga, 13 June 1989, G. Osella; 1 ♂, Isola di Sant'Antioco, Fonte Cannai, 30 m a.s.l., 5 May 2000, R. Poggi (MSNG); 4 ♂, 5 ♀, Siliqua, Argiolas, October 1999, L. Fancello (MSNG); 1 ♀, 1 tritonymph, Sinnai, San Basilio, Rio Longu, September 1999, L. Fancello (MSNG); 1 ♀, Villasalto, Foresta Riu Tolu, 250 m a.s.l., October 1999, L. Fancello (MSNG); 2 ♂, 2 ♀, Monte Sette Fratelli, San Pietro, 200–400 m a.s.l., October 1999, L. Fancello (MSNG).

**Diagnosis.**—A *Geogarypus* that differs from other extant and fossil species of the genus in the following combination of characters: carapace red-brown, uniformly coloured, legs not banded; tergites individed, most sternites divided by a median

thin suture, pseudotactile setae absent; vestitural setae not clavate; legs diplotarsate; galea of male simple, acuminate, of female with 9 distal rami; pedipalpal hand, chiefly in males, often darker than other chelal segments; paraxial surface of pedipalpal hand with a weak rounded hump at the base of fixed finger; pedipalpal femur and patella rarely weakly wrinkled; fixed and movable chelal fingers respectively with 8 and 4 trichobothria; trichobothrium *it* mostly closer to *et* than *ist*, *est* mostly halfway between *isb* and *ib*, trichobothrium *st* closer to *sb* than *t*; fixed chelal finger weakly heterodentate, with 4 to 9 paraxial additional teeth on the proximal half; 1 (rarely 2) pit-like structure (*pls*) at level of trichobothrium *est*; venom ducts long, nodus ramosus respectively at level of *est* and between *st-sb*; length of pedipalpal femur 0.45–0.60 (♂), 0.55–0.82 (♀) mm, length of chela with pedicel 0.75–0.94 (♂), 0.89–1.33 (♀) mm.

**Description (adults).**—Integument pigmented, carapace and pedipalps (fingers excepted) with star-like hispid granulation and small investing setae apically slightly sygmoid; carapace uniformly red-brown; tergites red-brown, I–II with a darker area on each extremity and one in the middle, III–VIII with a thin white area in the middle; sternites IV–VIII uncoloured in the middle; pedipalps red-brown, hand (chiefly in males) often darker than other palpal segments; legs uniformly pale; pleural membrane longitudinally wrinkled-plicate, with transverse series of investing microsetae. Carapace (Fig. 3) 1.0–1.2 times as long as broad, subtriangular, with notch on anterior margin; anterior margin with 4 setae, the lateral longer and thicker than the medial ones; posterior margin with 10–16 setae; anterior furrow nearer the posterior eyes than the posterior margin of carapace, posterior basal furrow nearly indistinct; ocular area as in Fig. 3, diameter of eyes 0.05–0.065 mm; ratio of cucullus/carapace length 0.23–0.30. Chaetotaxy and lyrifissures (in brackets) of tergites I–XII: 10–15(6–8): 12–15(8–10): 12–16(8–10): 14–18(8–10): 14–17(8–10): 13–20(8–10): 13–16(8–10): 12–18(8–10): 10–14(8–10): 9–12(10): 8–9(6): 2(0). Chaetotaxy of sternites II–XII: ♂, 11–14: (1)8–13(1–2): (1)10–14(1): 14–18: 14–20: 14–19: 14–18: 11–14: 6–10: 2:0; ♀, 10–14: (1–2)6–10(1–2): (1–2)11–16(1–2): 15–18: 15–19: 14–19: 13–18: 9–13: 7–8: 2:0; tergites and sternites XI–XII as in Fig. 4; sternites II–IV with setae, spiracles and tracheae of ♂ and ♀ respectively in Figs. 5 and 6; genitalia of ♂ and ♀ respectively in Figs. 7 and 8; genital atrium of ♂ with 2+2 (rarely 2+4) setae. Chelicerae (Figs. 9–11) 1.7–2.0 times as long as broad, palm with 5 setae, *bs* shorter and thicker than others; fixed finger with 4–6 teeth; movable finger with 3–5 subapical reduced teeth with rounded tips, *gs* subapical; galea simple, acuminate in ♂, with 9 apical rami in ♀ (Fig. 11); rallum with one aspinose blade; serrula exterior with 15 blades, the two proximal blades sickle-shaped, the distal one acuminate and stretched forwards (Figs. 10–11). Coxal area (Fig. 12): manducatory process with 3 setae, the lateral one shorter; pedipalpal coxa with 14–19 setae (the antero-lateral one, on maxillary shoulder, very long) and two circular lyrifissures (*mml* and *pml*); chaetotaxy of eoxae I–IV: I 3–5 (mostly 4), II 4–7 (mostly 6, rarely 4), III 8–14 (mostly 11–12), IV 17–21 (♂) 22–30 (♀); coxae III–IV without granulation, lyrifissures as in Fig. 13. Pedipalp: trochanter (Figs. 13–14) 1.45–1.65 times as long as broad, with a ventral rounded apophysis; femur (Fig. 13) 3.05–3.55 times as long as broad, with short pedicel;

patella (Fig. 13) 2.6–2.8 times as long as broad; chela with pedicel (Figs. 15–16) 3.45–4.25 ( $\delta$ ), 3.3–3.8 ( $\varphi$ ) times as long as broad, 3.9–4.25 ( $\delta$ ), 3.7–4.1 ( $\varphi$ ) times as long as deep; hand of chela with pedicel 1.55–1.95 ( $\delta$ ), 1.55–1.75 ( $\varphi$ ) times as long as broad, 1.8–2.05 ( $\delta$ ), 1.7–1.95 ( $\varphi$ ) times as long as deep; paraxial surface of pedipalpal hand, in dorsal view, with a weak rounded hump at the base of fixed finger; fixed and movable fingers respectively with 8 and 4 trichobothria (Fig. 16), *it* mostly closer to *et* than *ist* (rarely *it* halfway between *et-ist*; Fig. 16), *est* mostly halfway between *isb* and *ib* (rarely *est* nearer *ib* than *isb*; Fig. 16); dorsal surface of fixed chelal finger granulated as far as trichobothrium *est*; fixed chelal finger with 30–36 teeth with dental canals and 3–5 basal microtubercles; distal half of fixed chelal finger slightly heterodentate (one long tooth alternate with two shorter teeth; Fig. 16), with acuminate, anteriorly slightly curved teeth; proximal half of fixed chelal finger with triangular teeth gradually rounded and reduced in size towards the finger base and with 4 to 9 paraxial additional teeth—with dental canals—on the proximal half (rarely 1–2 additional teeth distad of the mid-finger) (Figs. 46–47); 1 (rarely 2) pit-like structure (*pls*; Fig. 16) at level of trichobothrium *est*; venom ducts long, nodus ramosus respectively at level of *est* and between *st-sb*; movable chelal finger with 27–38 teeth with dental canals, distal quarter of movable finger with 6–12 triangular, acuminate teeth (the distal one small) and, proximad of trichobothrium *t*, with flat teeth gradually reduced in size, reaching back to *b*; trichobothrium *st* closer to *sb* than *t*; ratio of movable finger/hand of chela with pedicel 1.1–1.4 ( $\delta$ ), 1.0–1.3 ( $\varphi$ ); ratio of pedipalpal femur/movable finger 1.0–1.25 ( $\delta$ ), 1.0–1.1 ( $\varphi$ ); ratio of pedipalpal femur/carapace 0.9–1.0 ( $\delta$ ), 0.9–1.1 ( $\varphi$ ). Leg I (Fig. 17): trochanter 1.2–1.4, femur 2.3–2.8, patella 1.4–1.65, tibia 2.5–3.2, metatarsus 2.3–2.8, tarsus 3.0–4.0 times as long as deep; claws smooth and shorter than arolium. Leg IV (Fig. 18): trochanter 1.3–1.8, femur 1.2–1.45, patella 2.4–2.9, tibia 3.2–4.2, metatarsus 2.5–3.1, tarsus 3.1–3.75 times as long as deep; claws smooth and shorter than arolium.

Measurements (in mm). Body length 1.4–1.8 ( $\delta$ ), 1.6–2.2 ( $\varphi$ ). Carapace 0.48–0.60  $\times$  0.47–0.56 ( $\delta$ ), 0.60–0.74  $\times$  0.53–0.74 ( $\varphi$ ), cucullus length (from anterior eyes) 0.12–0.16 ( $\delta$ ), 0.15–0.20 ( $\varphi$ ). Chelicerae 0.15–0.17  $\times$  0.075–0.10 ( $\delta$ ), 0.18–0.25  $\times$  0.095–0.135 ( $\varphi$ ), movable finger length 0.08–0.12 ( $\delta$ ), 0.11–0.155 ( $\varphi$ ). Pedipalp: trochanter 0.22–0.26  $\times$  0.15–0.17 ( $\delta$ ), 0.25–0.345  $\times$  0.17–0.225 ( $\varphi$ ); femur 0.45–0.60  $\times$  0.14–0.18 ( $\delta$ ), 0.55–0.82  $\times$  0.17–0.25 ( $\varphi$ ); patella 0.35–0.45  $\times$  0.13–0.17 ( $\delta$ ), 0.44–0.62  $\times$  0.16–0.22 ( $\varphi$ ); chela (with pedicel) 0.75–0.94  $\times$  0.20–0.26 ( $\delta$ ), 0.89–1.33  $\times$  0.25–0.38; chela (without pedicel) length 0.72–0.90 ( $\delta$ ), 0.85–1.29 ( $\varphi$ ); chela depth 0.18–0.23 ( $\delta$ ), 0.23–0.35 ( $\varphi$ ); hand length (with pedicel) 0.32–0.44 ( $\delta$ ), 0.40–0.60 ( $\varphi$ ); hand length (without pedicel) 0.29–0.395 ( $\delta$ ), 0.36–0.56 ( $\varphi$ ); movable finger length 0.44–0.52 ( $\delta$ ), 0.50–0.76 ( $\varphi$ ). Leg I: trochanter 0.11–0.135  $\times$  0.08–0.105 ( $\delta$ ), 0.135–0.16  $\times$  0.10–0.12 ( $\varphi$ ); femur 0.18–0.245  $\times$  0.08–0.09 ( $\delta$ ), 0.23–0.30  $\times$  0.085–0.11 ( $\varphi$ ); patella 0.11–0.13  $\times$  0.075–0.09 ( $\delta$ ), 0.125–0.17  $\times$  0.08–0.11 ( $\varphi$ ); tibia 0.15–0.19  $\times$  0.06–0.07 ( $\delta$ ), 0.18–0.26  $\times$  0.06–0.08 ( $\varphi$ ); metatarsus 0.095–0.13  $\times$  0.04–0.055 ( $\delta$ ), 0.12–0.17  $\times$  0.05–0.06 ( $\varphi$ ); tarsus 0.10–0.14  $\times$  0.035–0.04 ( $\delta$ ), 0.12–0.16  $\times$  0.04–0.045 ( $\varphi$ ). Leg IV: trochanter 0.16–0.20  $\times$  0.10–0.13 ( $\delta$ ), 0.18–0.24  $\times$  0.115–0.15 ( $\varphi$ ); femur 0.095–0.13  $\times$  0.075–0.09 ( $\delta$ ), 0.11–0.15  $\times$  0.075–0.105 ( $\varphi$ ); patella 0.28–0.38

$\times$  0.115–0.16 ( $\delta$ ), 0.34–0.50  $\times$  0.125–0.20 ( $\varphi$ ); tibia 0.265–0.33  $\times$  0.07–0.10 ( $\delta$ ), 0.30–0.46  $\times$  0.08–0.11 ( $\varphi$ ); metatarsus 0.13–0.16  $\times$  0.05–0.06 ( $\delta$ ), 0.16–0.21  $\times$  0.06–0.07 ( $\varphi$ ); tarsus 0.14–0.16  $\times$  0.04–0.05 ( $\delta$ ), 0.15–0.19  $\times$  0.045–0.06 ( $\varphi$ ).

**Description (tritonymph).**—Carapace and pedipalps with weak pigmentation and granulation. Carapace 0.9–1.05 times as long as broad, furrows, anterior setae and ocular area as in adults; posterior margin with 10–13 setae; diameter of anterior eyes 0.045–0.055 mm, posterior eyes 0.040–0.050 mm; ratio of cucullus/carapace length 0.20–0.24. Chaetotaxy and lyrifissures (in brackets) of tergites I–XII: 10–11(8); 8–12(6–8); 10–12(6–8); 10–11(6–8); 10–11(7–8); 10–12(8); 10–11(8); 9–11(6–8); 9–10(8–9); 10(8); 8(8); 2(0). Chaetotaxy of sternites II–XII: 2–4; (1)4–6(1); (1)7–10(1); 12; 12–14; 12–14; 10–13; 7–9; 6; 2; 0. Chelicerae 1.75–1.9 times as long as broad, palm with 5 setae; fixed finger with 4–5 teeth; movable finger with 3–4 subapical reduced teeth with rounded tips, *gs* subapical; galea with 7 apical rami; rallum with one aspinose blade; serrula exterior with 13 blades, shape of proximal and distal blades as in adult. Coxal area: manducatory process with 3 setae, the lateral one shorter; pedipalpal coxa with 13–14 setae (the antero-lateral one very long) and two circular lyrifissures (*mml* and *pml*); chaetotaxy of eoxae I–IV: I 3–4, II 4–5, III 6–8, IV 12–13. Pedipalp: trochanter 1.4–1.5 times as long as broad, with a ventral rounded apophysis; femur 3.2–3.6 times as long as broad, with short pedicel; patella 2.55–2.8 times as long as broad; chela with pedicel (Figs. 19–20) 3.8–3.9 times as long as broad, 4.05–4.35 times as long as deep; hand of chela with pedicel 1.65–1.8 times as long as broad, 1.85–1.95 times as long as deep; fixed and movable fingers respectively with 7 and 3 trichobothria (Fig. 20), *isb* and *sb* absent; dorsal surface of fixed chelal finger granulated as far as trichobothrium *est*; fixed chelal finger with 27–35 teeth with dental canals and 2–3 basal microtubercles; distal half of fixed chelal finger slightly heterodentate (one long tooth alternate with two shorter teeth; Fig. 20), with acuminate, anteriorly slightly curved teeth; proximal half of fixed chelal finger with triangular teeth gradually reduced in size towards the finger base and with 2 to 7 paraxial additional teeth—with dental canals—on the proximal half (rarely 2 additional teeth distad of the mid-finger); 1 pit-like structure (*pls*) at level of trichobothrium *est* (Fig. 20); venom ducts long, nodus ramosus respectively distad of *est* and *st*; movable chelal finger with 22–32 teeth with dental canals, distal third of movable finger with 7–10 triangular, acuminate teeth and, proximad of trichobothrium *t*, with flat teeth gradually reduced in size, reaching back halfway between *st-b*; ratio of movable finger/hand of chela with pedicel 1.15–1.25; ratio of pedipalpal femur/movable finger 1.05–1.15; ratio of pedipalpal femur/carapace 0.9–1.0. Leg I: trochanter 1.2–1.4, femur 2.1–2.8, patella 1.5–1.7, tibia 2.5–2.8, metatarsus 2.2, tarsus 2.5, metatarsus+tarsus 4.3–5.0 times as long as deep; claws smooth and shorter than arolium. Leg IV: trochanter 1.5–2.1, femur 1.2–1.4, patella 2.4–2.7, tibia 3.4–3.85, metatarsus 2.3–2.8, tarsus 2.7–3.5 times as long as deep; claws smooth and shorter than arolium.

Measurements (in mm). Body length 1.3–1.6. Carapace 0.47–0.55  $\times$  0.455–0.54, cucullus length (from anterior eyes) 0.095–0.125. Chelicerae 0.135–0.17  $\times$  0.07–0.09, movable finger length 0.09–0.10. Pedipalp: trochanter 0.18–0.225  $\times$  0.13–0.145; femur 0.43–0.50  $\times$  0.12–0.155; patella 0.305–0.365

$\times 0.115$ – $0.135$ ; chela (with pedicel)  $0.70$ – $0.85 \times 0.18$ – $0.225$ ; chela (without pedicel) length  $0.67$ – $0.82$ ; chela depth  $0.16$ – $0.205$ ; hand length (with pedicel)  $0.30$ – $0.38$ ; hand length (without pedicel)  $0.27$ – $0.35$ ; movable finger length  $0.38$ – $0.47$ . Leg I: trochanter  $0.11$ – $0.115 \times 0.08$ – $0.09$ ; femur  $0.17$ – $0.22 \times 0.07$ – $0.085$ ; patella  $0.105$ – $0.115 \times 0.065$ – $0.075$ ; tibia  $0.125$ – $0.17 \times 0.05$ – $0.06$ ; metatarsus  $0.10 \times 0.045$ – $0.05$ ; tarsus  $0.10$ – $0.12 \times 0.04$ ; metatarsus + tarsus  $0.20$ – $0.22 \times 0.045$ – $0.05$ . Leg IV: trochanter  $0.15$ – $0.17 \times 0.08$ – $0.10$ ; femur  $0.08$ – $0.105 \times 0.07$ – $0.085$ ; patella  $0.255$ – $0.31 \times 0.105$ – $0.12$ ; tibia  $0.24$ – $0.28 \times 0.065$ – $0.075$ ; metatarsus  $0.115$ – $0.15 \times 0.05$ – $0.06$ ; tarsus  $0.12$ – $0.14 \times 0.04$ – $0.045$ .

**Description (deutonymph).**—Carapace and pedipalps with weak pigmentation and granulation. Carapace  $0.95$ – $1.0$  times as long as broad, anterior setae and ocular area as in adults, furrows nearly indistinct; posterior margin with 8 setae; diameter of anterior eyes  $0.035$ – $0.050$  mm, posterior eyes  $0.035$ – $0.045$  mm; ratio of cucullus/carapace length  $0.22$ – $0.235$ . Chaetotaxy and lyrifissures (in brackets) of tergites I–XII: 7–8(4): 6–8(4): 6(6): 6(6): 6–7(6): 6(6): 6(6): 6(6): 6–7(6): 6(6): 4(?): 2(0). Chaetotaxy of sternites II–XII: 0: (1)4(1): (1)4(1): 6–7: 6: 6: 4–5: 4: 2: 0. Chelieerae  $1.6$ – $1.7$  times as long as broad, palm with 5 setae; fixed finger with 4 teeth; movable finger with 3 subapical reduced teeth with rounded tips, *gs* subapical; galea with 5 apical rami; rallum with one aspinose blade; serrula exterior with 11 blades, shape of proximal and distal blades as in adult. Coxal area: manducatory process with 3 setae, the lateral one shorter; pedipalpal coxa with 7–8 setae (the antero-lateral one very long) and two circular lyrifissures (*mml* and *pml*); chaetotaxy of coxae I–IV: I 2, II 3, III 3–5, IV 4–7. Pedipalp: trochanter  $1.4$ – $1.55$  times as long as broad, with a ventral rounded apophysis; femur  $3.2$ – $3.75$  times as long as broad, with a short pedicel; patella  $2.45$ – $2.65$  times as long as broad; chela with pedicel (Figs. 21–22)  $3.9$ – $4.35$  times as long as broad,  $4.2$ – $4.65$  times as long as deep; hand of chela with pedicel  $1.7$ – $1.9$  times as long as broad,  $1.9$ – $2.05$  times as long as deep; fixed and movable fingers respectively with 6 and 2 trichobothria (Fig. 22), *isb*, *esb* and *st*, *sb* absent; dorsal surface of fixed chelal finger granulated as far as trichobothrium *est*; fixed chelal finger with 22–33 teeth with dental canals and 2–3 basal microtubercles; distal third of fixed chelal finger slightly heterodentate (one long tooth alternate with two shorter teeth; Fig. 22), with acuminate teeth; proximal two thirds of fixed chelal finger with triangular teeth gradually reduced in size towards the finger base and with 2–4 paraxial additional teeth—with dental canals—on the proximal half; 1 pit-like structure (*pls*) distad of trichobothrium *est* (Fig. 22); venom ducts long, nodus ramosus respectively distad of *est* and halfway between *b*–*t*; movable chelal finger with 19–27 teeth with dental canals, distal third of movable finger with 7–10 triangular, acuminate teeth and, proximad of trichobothrium *t*, with flat teeth gradually reduced in size, reaching back to *b*; ratio of movable finger/hand of chela with pedicel  $1.1$ – $1.25$ ; ratio of pedipalpal femur/movable finger  $1.0$ – $1.1$ ; ratio of pedipalpal femur/carapace  $0.8$ – $0.9$ . Leg I: trochanter  $1.2$ – $1.4$ , femur  $2.2$ – $2.8$ , patella  $1.3$ – $1.65$ , tibia  $2.0$ – $2.5$ , metatarsus+tarsus  $4.25$ – $4.5$  times as long as deep; claws smooth and shorter than arolium. Leg IV: trochanter  $1.4$ – $1.6$ , femur  $1.05$ – $1.35$ , patella  $2.35$ – $2.45$ , tibia  $3.2$ – $3.65$ , metatarsus  $1.95$ – $2.5$ ,

tarsus  $2.5$ – $3.2$  times as long as deep; claws smooth and shorter than arolium.

Measurements (in mm). Body length  $1.0$ – $1.3$ . Carapace  $0.38$ – $0.45 \times 0.39$ – $0.44$ , cucullus length (from anterior eyes)  $0.09$ – $0.10$ . Chelieerae  $0.11$ – $0.13 \times 0.065$ – $0.07$ , movable finger length  $0.07$ – $0.09$ . Pedipalp: trochanter  $0.14$ – $0.155 \times 0.09$ – $0.11$ ; femur  $0.32$ – $0.40 \times 0.09$ – $0.115$ ; patella  $0.23$ – $0.29 \times 0.09$ – $0.11$ ; chela (with pedicel)  $0.55$ – $0.70 \times 0.14$ – $0.16$ ; chela (without pedicel) length  $0.52$ – $0.68$ ; chela depth  $0.13$ – $0.15$ ; hand length (with pedicel)  $0.25$ – $0.31$ ; hand length (without pedicel)  $0.23$ – $0.29$ ; movable finger length  $0.30$ – $0.39$ . Leg I: trochanter  $0.075$ – $0.09 \times 0.06$ – $0.065$ ; femur  $0.13$ – $0.17 \times 0.055$ – $0.06$ ; patella  $0.07$ – $0.10 \times 0.055$ – $0.06$ ; tibia  $0.10$ – $0.125 \times 0.045$ – $0.05$ ; metatarsus + tarsus  $0.15$ – $0.18 \times 0.035$ – $0.04$ . Leg IV: trochanter  $0.095$ – $0.14 \times 0.065$ – $0.085$ ; femur  $0.07$ – $0.095 \times 0.06$ – $0.075$ ; patella  $0.19$ – $0.24 \times 0.075$ – $0.10$ ; tibia  $0.16$ – $0.22 \times 0.05$ – $0.06$ ; metatarsus  $0.08$ – $0.10 \times 0.04$ – $0.05$ ; tarsus  $0.10$ – $0.11 \times 0.03$ – $0.04$ .

**Description (protonymph).**—Carapace and pedipalps whitish, with weak granulation. Carapace  $0.9$  times as long as broad, anterior setae and ocular area as in adults, furrows indistinct; posterior margin with 4 setae; diameter of anterior eyes  $0.037$  mm, posterior eyes  $0.034$  mm; ratio of cucullus/carapace length  $0.23$ . Tergites I–XI with 4 setae, tergite XII 2. Chaetotaxy of sternites II–XII: 0: (0)2(0): (1)2(1): 4: 4: 4: 4: 4: 4: 0. Chelicerae  $1.7$  times as long as broad, palm with 4 setae, *sbs* absent; fixed finger with 4 teeth; movable finger with 2–3 subapical reduced teeth with rounded tips, *gs* absent; galea with 3 apical rami; rallum with one aspinose blade; serrula exterior with 10 blades, shape of proximal and distal blades as in adult. Coxal area: manducatory process with 2 setae (lateral seta absent); pedipalpal coxa with 3 setae (the anterior very long) and one circular lyrifissure (*mml*); chaetotaxy of coxae I–IV: 1. Pedipalp: trochanter  $1.5$  times as long as broad, with a ventral rounded apophysis; femur  $3.3$  times as long as broad, with a distinct pedicel; patella  $2.6$  times as long as broad; chela with pedicel (Figs. 23–24)  $4.14$  times as long as broad,  $4.3$  times as long as deep; hand of chela with pedicel  $1.9$  times as long as broad,  $2.0$  times as long as deep; fixed and movable fingers respectively with 3 and 1 trichobothria (Fig. 24), *it*, *est*, *isb*, *ib*, *esb* and *st*, *sb*, *b* absent; dorsal surface of fixed chelal finger slightly granulated as far as trichobothrium *eb*; fixed chelal finger with 23 teeth with dental canals and 5 basal microtubercles; distal third of fixed chelal finger slightly heterodentate, with acuminate teeth; proximal two thirds of fixed chelal finger with triangular teeth gradually rounded and reduced in size towards the finger base; additional teeth absent; 1 pit-like structure (*pls*) at level of trichobothrium *ist* (Fig. 24); venom ducts long, nodus ramosus respectively proximad of *ist* and *t*; movable chelal finger with 19 teeth with dental canals, distal third of movable finger with 7 triangular, acuminate teeth, proximally with flat teeth gradually reduced in size; ratio of movable finger/hand of chela with pedicel  $1.15$ ; ratio of pedipalpal femur/movable finger  $1.1$ ; ratio of pedipalpal femur/carapace  $0.9$ . Leg I: trochanter  $1.05$ , femur  $2.35$ , patella  $1.35$ , tibia  $2.0$ , metatarsus+tarsus  $3.5$  times as long as deep; claws smooth and shorter than arolium. Leg IV: trochanter  $1.65$ , femur  $1.3$ , patella  $2.4$ , tibia  $3.0$ , metatarsus  $2.1$ , tarsus  $2.85$  times as long as deep; claws smooth and shorter than arolium.

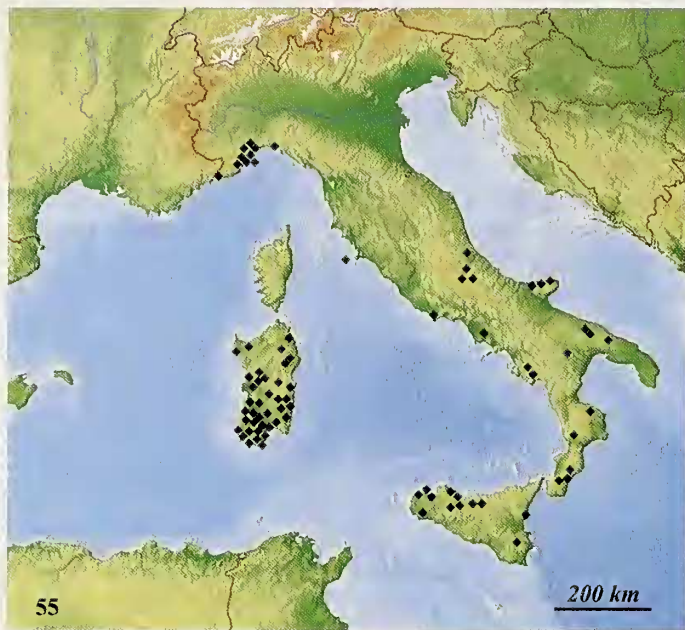


Figure 55.—Map depicting distribution of *Geogarypus italicus* sp. nov.

Measurements (in mm). Body length 0.8. Carapace  $0.34 \times 0.39$ , cucullus length (from anterior eyes) 0.08. Chelicerae  $0.11 \times 0.065$ , movable finger length 0.07. Pedipalp: trochanter  $0.135 \times 0.09$ ; femur  $0.30 \times 0.09$ ; patella  $0.22 \times 0.085$ ; chela (with pedicel)  $0.52 \times 0.125$ ; chela (without pedicel) length 0.50; chela depth 0.12; hand length (with pedicel) 0.24; hand length (without pedicel) 0.22; movable finger length 0.28. Leg I: trochanter  $0.07 \times 0.065$ ; femur  $0.13 \times 0.055$ ; patella  $0.075 \times 0.055$ ; tibia  $0.10 \times 0.055$ ; metatarsus + tarsus  $0.14 \times 0.04$ . Leg IV: trochanter  $0.10 \times 0.06$ ; femur  $0.07 \times 0.055$ ; patella  $0.17 \times 0.07$ ; tibia  $0.15 \times 0.05$ ; metatarsus  $0.085 \times 0.04$ ; tarsus  $0.10 \times 0.035$ .

**Distribution.**—*Geogarypus minor* has been recorded from Algeria, Morocco, Portugal, Spain, France, Italy, Malta, Croatia, Albania, Greece, Turkey, and possibly Sudan.

**Remarks.**—*Geogarypus minor* was described by L. Koch (1873)—as *Garypus minor*—on an uncertain number of Corsican specimens received from Eugène Simon. The original text does not reveal if Koch's description is based on one or more specimens, and even the indication of the type locality ("Auf Corsica von Herrn E. Simon entdeckt") does not give any information on this subject; the sentence (p. 39) "das bewegliche Zangenglied in ein feines Stielchen endend" certainly deals with the shape of the female galea, but it is uncertain if this character was observed in one or more specimens. The female deposited in Ludwig Koch's Collection (NHM) was regarded as a syntype by Judson (1997), as there is no evidence that it is the holotype, whereas specimens of *G. minor* in Simon's Collection (MNHN) are a mixture of probable type and non-type material (see above: Type material examined). Therefore, the female of NHM is here designated as the lectotype of *G. minor*.

A redescription of *Garypus minor*, likely based on the examination of specimens (including males) from Corsica and Algeria, was published by Simon (1879), and was followed by

the description of a new species, *Garypus nigrimanus*, based on specimens collected in southern France (Montpellier and Hyères) and Corsica. The key to species proposed by Simon provides only a single character to distinguish *G. minor* from *G. nigrimanus*, i.e., the different granulation of the palpal segments: clearly wrinkled and gnarled in *G. minor*, smooth in *G. nigrimanus*. This is in evident contrast to the original description of *G. minor* ("Das Femoralglied...fein granuliert") (Koch 1873) and also with respect to the full description of palpal granulation of both species given by Simon (1879). All subsequent authors have distinguished *G. minor* from *G. nigrimanus* based chiefly on the characters proposed by Simon (1879), except for Ellingsen (1908) (see Remarks under *Geogarypus italicus*).

After Chamberlin (1930), who established the genus *Geogarypus* with *Garypus minor* as the type species and proposed a key to species including *G. nigrimanus*, very little morphological data on these species are presented in subsequent literature. Apart from a dorso-ventral illustration of *G. nigrimanus* (Chamberlin 1931), both *G. minor* and *G. nigrimanus* were redescribed, with illustration of respective pedipalps, by Beier (1932, reproduced in Beier 1963b) based upon specimens of unknown provenance. Some basic morphometric data of an insular population of *G. minor* were reported by Gardini (1975) and an illustration of the pedipalp of a male of the above species is provided by Harvey (1986).

The female lectotype of *G. minor* (Fig. 1) corresponds well to the original description of the species, chiefly in palpal granulation, with the femur lacking in wrinkles. Comparison of the lectotype and the probable type and non-type specimens of both *G. minor* and *G. nigrimanus*, together with the examination of the above listed material (Fig. 54, including specimens from Montpellier, Hyères and Corsica), reveals that the palpal granulation is mostly fine, rarely with the femur weakly wrinkled; besides, all of the specimens examined share the shape of the chelal hand with a weak rounded hump on the paraxial surface at the base of fixed finger (see Figs. 1, 15 and Chamberlin 1931:227, fig. 62; Harvey 1986:759, fig. 4). The following synonymy is therefore proposed: *Geogarypus nigrimanus* (Simon, 1879) is a new junior subjective synonym of *Geogarypus minor* (L. Koch, 1873).

The synonymy of *Geogarypus meridionalis* (Canestrini, 1885) with *G. minor*—first proposed by Beier (1963b)—is confirmed in spite of the types collected from Rome being untraceable, since all specimens examined from the type locality belong to *G. minor*.

Many Mediterranean records of *G. minor* (Harvey 2011, 2013) remain to be verified (see Remarks under *G. italicus*).

*Geogarypus minor* is most similar to *G. canariensis* (Tullgren, 1900) from Tenerife, Canary Islands. The key presented below compares *G. minor* and the other Mediterranean-Macaronesian species of *Geogarypus*.

***Geogarypus italicus* sp. nov.**

<http://zoobank.org/NomenclaturalActs/urn:lsid:zoobank.org:act:7546836B-334E-4B02-AA7A-BA7BF2DCE8FA>

Figs. 2, 25–45, 48–51, 55

*Garypus minor*: Simon 1898:21 (Uras, Cagliari, Flumentorgiu); Gestro 1904:14 (Uras, Cagliari, Flumentorgiu, Capo Caccia; Golfo Aranci, in part: see *G. minor*); Ellingsen

1908:670 (in part: see *G. minor*); Ellingsen 1909:207, 209 (Camaldoli, Vallo di Lucania; Golfo Aranci, in part: see *G. minor*).

*Geogarypus minor*: Beier 1962:285 (Rodi Garganico); Lazzeroni 1969:335 (Rodi Garganico; Ciminà, Antonimina, in part: see *G. minor*).

**Material examined.**—*Holotype male*: ITALY: *Liguria: Savona Prov.*: Bergeggi, soil on cork oak wood (44°15'27"N, 8°26'35"E), 100 m a.s.l., 30 July 2007, M. Capurro, D. Duradoni & L. Galli (deposited in MHNG).

*Paratypes*: *Liguria: Imperia Prov.*: 1 ♂ (together with 1 ♀ of *G. minor*), Ventimiglia, Val Bevera, Torri, 60 m a.s.l., 31 March 2008, R. Poggi (MSNG). *Liguria: Savona Prov.*: 3 ♂, 1 ♀, 1 tritonymph, 1 deutonymph, Villanova di Albenga, Coasco, 44°03'18"N, 8°07'37"E, 54 m a.s.l., 21 September 2015, G. Gardini, C. Giusto & A. Trotta, Mediterranean scrub; 2 ♂, near Toirano, 16 February 1985, G. Gardini, under *Olea europaea*; 2 ♂, 2 ♀, Boissano, 11 March 1979, G. Gardini, under *Pistacia lentiscus*; 1 ♀, Boissano, slope Monte Ravinet, 6 May 1990, G. Gardini & R. Benelli, under *Pistacia lentiscus*; 2 ♂, Boissano, slope SW Monte Ravinet, 900 m a.s.l., 10 April 1977, S. Zoia; 1 ♂, Finale Ligure, Perti, 145 m a.s.l., 19 November 2016, R. Poggi (MSNG); 1 deutonymph, Noli, Capo Noli, 7 January 1973, G. Gardini; 1 ♀, Noli, Capo Noli, 14 January 1973, G. Gardini; 1 ♀, Noli, Capo Noli, 3 April 1977, G. Gardini & S. Zoia, sieved in garigue; 2 ♀, 3 tritonymphs (together with 1 ♂, 1 ♀ of *G. minor*), Spotorno, 16 January 1977, G. Gardini, under *Pistacia lentiscus*; 1 ♂, 1 ♀, Bergeggi, 44°15'27"N, 8°26'35"E, 100 m a.s.l., 1 January 2007, M. Capurro, D. Duradoni & L. Galli, soil on cork oak wood; 17 ♂, 3 ♀, 3 tritonymphs, Bergeggi, 6 March 2007, M. Capurro, D. Duradoni & L. Galli, soil on cork oak wood; 13 ♂, 8 ♀, 4 tritonymphs, 1 deutonymph, 5 protonymphs, Bergeggi, 9 May 2007, M. Capurro, D. Duradoni & L. Galli, soil on cork oak wood; 20 ♂, 11 ♀, 24 tritonymphs, 19 protonymphs, Bergeggi, 5 July 2007, M. Capurro, D. Duradoni & L. Galli, soil on cork oak wood; 1 ♂, 1 tritonymph, 28 deutonymphs, 35 protonymphs, Bergeggi, 30 July 2007, M. Capurro, D. Duradoni & L. Galli, soil on cork oak wood; 26 ♂, 1 ♀, 15 tritonymphs, 11 deutonymphs, Bergeggi, 17 September 2007, M. Capurro, D. Duradoni & L. Galli, soil on cork oak wood; 8 ♂, 7 ♀, 18 tritonymphs, 5 deutonymphs, Bergeggi, 15 October 2007, M. Capurro, D. Duradoni & L. Galli, soil on cork oak wood; 9 ♂, 8 ♀, 19 tritonymphs, 7 deutonymphs, 2 protonymphs, Bergeggi, 20 November 2007, M. Capurro, D. Duradoni & L. Galli, soil on cork oak wood; 4 ♂, 2 ♀, 4 tritonymphs, 2 deutonymphs, Bergeggi, 28 December 2007, M. Capurro, D. Duradoni & L. Galli, soil on cork oak wood; 6 ♂, 3 ♀, 6 tritonymphs, 2 deutonymphs, Bergeggi, 31 January 2008, M. Capurro, D. Duradoni & L. Galli, soil on cork oak wood; 1 ♂, 2 ♀, Bergeggi, 16 March 2008, R. Poggi (MSNG); 4 ♀, 2 deutonymphs, Bergeggi, Isola di Bergeggi, 13 May 2003, G. Gardini & A. Trotta; 5 ♂, 5 ♀, 2 tritonymphs (together with 3 ♂, 1 tritonymph of *G. minor*), Bergeggi, Isola di Bergeggi, 7 May 2007, R. Poggi (MSNG); 1 ♀, 1 tritonymph, Bergeggi, Isola di Bergeggi, 21 May 2007, E. Borgo (MSNG); 1 tritonymph, Segno, Rocca dei Corvi, 1 March 1983, S. Zoia; 1 ♀, 1 deutonymph, Quiliano, Tre Ponti, 80 m a.s.l., 29 October 1980, G. Gardini & S. Zoia. *Liguria: Genoa Prov.*: 3 ♂

(together with 1 ♂ of *G. minor*), Genova, Quinto al Mare, slope W Monte Moro, 44°23'44"N, 9°01'24"E, 240 m a.s.l., 26 November 2015, G. Gardini, under *Arbutus unedo*.

*Other material examined*: ITALY: *Tuscany: Grosseto Prov.*: 9 ♂, 10 ♀, 2 tritonymphs (*Garypus minor*, E. Ellingsen det.) (together with 9 ♂, 21 ♀ of *G. minor*), Isola del Giglio, [no date], G. Doria (MSNG); 2 ♀ (*Garypus minor*, E. Ellingsen det.) (together with 1 ♂, 2 ♀ of *G. minor*), Isola del Giglio, November 1902, G. Doria (MSNG); 2 ♂, 2 ♀, 1 tritonymph 1 deutonymph, Isola del Giglio, Promontorio del Franco, 17 April 1974, G. Gardini, *Quercus ilex* wood and under *Cistus*; 4 ♀, 1 tritonymph, Isola del Giglio, Promontorio del Franco, April 1985, A. Focarile, under *Cistus*. *Latium: Latina Prov.*: 2 ♂, 1 tritonymph, Circeo, Quarto Caldo, Faro, 5 m a.s.l., 15 June 2014, G. Gardini, under *Juniperus*. *Abruzzo: L'Aquila Prov.*: 2 ♀, 2 tritonymph, Fucino, Castelnuovo, 15 March 1992, G. Osella, under *Salix*; 3 ♂, 1 ♀, 1 tritonymph, Valle Peligna, 27 February 1992, M. Riti & G. Osella; 1 ♂, 2 ♀, 1 tritonymph, Valle Peligna, 19 March 1992, G. Osella; 3 ♀, 2 tritonymphs, 2 deutonymphs, Valle Peligna, 9 May 1992, M. Riti & G. Osella; 1 ♀, Valle Peligna, 16 May 1992, G. Osella; 3 ♀, 3 deutonymphs, Valle Peligna, 6 June 1992, Di Marco & Osella, under *Cistus*; 1 ♀, 1 tritonymph, Valle Peligna, 28 August 1992, G. Osella; 3 ♀, 1 tritonymph, 3 deutonymphs, Valle Peligna, 3 October 1992, G. Osella; 1 ♀, Valle Peligna, Sorgenti Fiume Pescara, 3 October 1992, G. Osella. *Abruzzo: Chieti Prov.*: 7 ♂, 3 tritonymphs (*Geogarypus minor*, M. Beier det.), near Chieti, 1912, A. Andreini (MSNG); 6 ♂, 8 ♀, 8 tritonymphs, 2 deutonymphs (*Geogarypus minor*, M. Beier det.), near Chieti, February 1912, A. Andreini, leaf litter (MSNG); 10 ♂, 7 ♀ (*Geogarypus minor*, M. Beier det.), near Chieti, March 1912, A. Andreini, leaf litter (MSNG). *Abruzzo: Pescara Prov.*: 3 ♀, 1 tritonymph, Popoli, 25 April 1999, G. Osella; 1 ♀, Popoli, Colle Capo Pescara, 42°09'57"N, 13°49'05"E, 350 m a.s.l., 18 June 1991, M. Riti; 1 ♀, 1 deutonymph, Popoli, Colle Capo Pescara, 19 August 1991, M. Riti; 2 ♂, 2 ♀, Popoli, Colle Capo Pescara, 29 August 1991, M. Riti, under *Thymus* and *Artemisia*; 1 ♂, 1 ♀, 1 tritonymph, Popoli, Colle Capo Pescara, 14 September 1991, G. Osella; 6 ♂, 10 ♀, 8 tritonymphs, 3 deutonymphs, Popoli, Colle Capo Pescara, 17 October 1991, G. Osella & M. Riti; 6 ♂, 8 ♀, 14 tritonymphs, Popoli, Colle Capo Pescara, 20 November 1991, G. Osella & M. Riti; 3 ♀, 1 tritonymph, Popoli, Colle Capo Pescara, 3 October 1992, G. Osella; 1 ♂, 1 ♀, Popoli, Colle Capo Pescara, 26 February 1994, G. Osella. *Campania: Naples Prov.*: 1 ♀ (*Garypus minor*, E. Ellingsen det.), Napoli, Camaldoli, 18 May 1904, F. Solari (MSNG). *Campania: Salerno Prov.*: 1 ♂, Vallo della Lucania, [no date], F. Solari (MSNG); 1 ♀, 1 tritonymph (*Garypus minor*, E. Ellingsen det.), Vallo della Lucania, May 1902, F. Solari (MSNG); 11 ♂, 5 ♀ (*Garypus minor*, E. Ellingsen det.), Vallo della Lucania, June 1904, F. Solari (MSNG); 1 ♂, 1 ♀, 1 deutonymph, San Giovanni a Piro, Monte Bulgheria, 800 m a.s.l., 20 April 1992, G. Gardini, *Quercus ilex* wood. *Basilicata: Matera Prov.*: 2 ♂, 2 ♀, Accettura, Bosco Gallipoli-Cognato, 1000 m a.s.l., 28 August 1989, F. Angelini, oak wood. *Apulia: Foggia Prov.*: 1 ♀ (*G. minor*, M. Beier det.), Rodi Garganico, 1 October 1961 (MSNV); 3 ♀, between Sannicandro and San Marco in Lamis, 600 m a.s.l., 8 April 1996, G. Osella, oak wood; 1 ♀, Peschici, Manacore del Gargano, Torre Usmai, 20 m a.s.l., 20 July

- 1996, C. Giusto. *Apulia: Bari Prov.*: 1 ♀ (*G. minor*, M. Beier det.), near Cassano Murge, November 1908, A. Andreini (MSNG); 2 ♀ (*G. minor*, M. Beier det.), Grumo Appula, December 1909, A. Andreini (MSNG). *Apulia: Taranto Prov.*: 1 ♀, near Martina Franca, 13 August 1995, S. Vit. *Calabria: Cosenza Prov.*: 1 ♂, Bocchigliero, Monte Basilicò, 1600 m a.s.l., 12 June 1992, G. Osella, oak wood; 2 ♂, 5 ♀, 5 tritonymphs, 1 deutonymph, Bocchigliero, Monte Basilicò, 900 m a.s.l., 9 October 1993, G. Osella, under *Quercus frainetto*; 1 ♂, 1 tritonymph, Bocchigliero, Monte Basilicò, 1 December 1994, G. Osella, under *Quercus* sp. *Calabria: Catanzaro Prov.*: 1 ♂, 1 ♀, Sambiasse, near Terme Caronte, 28 May 1985, S. Zoia & R. Rizzerio, *Quercus ilex* wood. *Calabria: Reggio di Calabria Prov.*: 1 ♂, 1 ♀, 2 tritonymphs (*G. minor*, G. Lazzeroni det.) (together with 2 ♀ of *G. minor*), Ciminà, 320 m a.s.l., 25 October 1966, G. Osella (MSNV); 2 tritonymphs (*Geogarypus* sp., G. Lazzeroni det.), Ciminà, 320 m a.s.l., 25 October 1966, G. Osella (MSNV); 2 ♀ (*G. minor*, G. Lazzeroni det.) (together with 2 ♂, 3 ♀ of *G. minor*), Antonimina, 350 m a.s.l., 26 October 1966, G. Osella (MSNV); 1 ♀, Delianuova, 8 April 1989, Gentile & Luchetti, pitfall trap; 1 ♂, 2 ♀, Delianuova, 14 June 1989, Gentile & Luchetti, pitfall traps. *Sicily: Palermo Prov.*: 1 ♂, Palermo, Monte Pellegrino, 3 October 1979, G. Gardini; 2 tritonymphs, Palermo, Monte Pellegrino, 400 m a.s.l., 16 March 2015, P. Magrini; 2 ♂, 2 ♀ (together with 5 ♀ of *G. minor*), Corleone, slope Rocca Busambra, 15 June 1981, G. Gardini; 1 deutonymph, Corleone, slope NE Rocca Busambra, 650 m a.s.l., 30 May 1985, R. Rizzerio & S. Zoia; 1 ♀, Corleone, Bosco della Ficuzza, near Case Cucco, 1000 m a.s.l., 29 May 1985, S. Zoia & R. Rizzerio; 1 ♂, 1 tritonymph, Corleone, Bosco della Ficuzza, 800 m a.s.l., 2 May 2000, S. Zoia & F. Polese, oak wood; 1 ♂, Corleone, Ficuzza, 6 January 1994, P. Magrini; 1 deutonymph, Caltavuturo, 450 m a.s.l., 30 May 1985, R. Rizzerio & S. Zoia, *Quercus ilex* wood; 1 deutonymph, Marineo, Bosco del Cappellero, 29 May 1985, R. Rizzerio & S. Zoia; 1 ♀, Scillato, Collesano, 2 January 1994, P. Magrini. *Sicily: Trapani Prov.*: 1 tritonymph, Castellammare, Monte Inici, 1000 m a.s.l., 30 December 1994, G. Gardini, under *Quercus ilex*; 2 ♂, 10 ♀, 1 tritonymph, Mazara del Vallo, Gorghetti Tondi, 30 April 2000, S. Zoia & F. Polese, *Quercus ilex* wood; 1 ♀, Custonaci, Monte Sparagio, 455 m a.s.l., 16 March 2015, P. Magrini; 9 ♂, 10 ♀, 7 tritonymphs, Scopello, Riserva Naturale dello Zingaro, 31 December 1994, G. Gardini & S. Zoia, *Quercus ilex* wood; 1 ♂, Scopello, Riserva Naturale dello Zingaro, 17 October 2001, B. Massa; 1 ♂ (together with 1 ♀ of *G. minor*), Scopello, Riserva Naturale dello Zingaro, 17 November 2001, B. Massa; 1 ♂, Scopello, Riserva Naturale dello Zingaro, 16 March 2002, B. Massa; 1 ♀ (together with 1 ♀, 2 tritonymphs of *G. minor*), Scopello, Riserva Naturale dello Zingaro, 26 May 2002, B. Massa; 1 ♀ (together with 1 ♀ of *G. minor*), Scopello, Riserva Naturale dello Zingaro, 30 June 2002, B. Massa; 1 ♀, 1 protonymph, Scopello, Riserva Naturale dello Zingaro, 14.VII.2002, B. Massa. *Sicily: Catania Prov.*: 1 ♀, 1 tritonymph, Aci Trezza, Isola Lachea, 28 April 2000, S. Zoia & F. Polese, under *Opuntia*. *Sicily: Siracusa Prov.*: 1 ♀, 1 tritonymph, Palazzolo Acreide, Bosco Bauli, 380 m a.s.l., 7 April 2011, P. Magrini. *Sardinia: Sassari Prov.*: 1 ♀ (*Garypus minor*, E. Simon det.), Capo Caccia, April 1902, A. Dodero (MSNG); 1 ♂ (*Garypus minor*, E. Simon det.) (together with 2 ♂, 2 ♀ of *G. minor*), Golfo Aranci, April 1902, A. Dodero (MSNG); 2 ♀ (*Garypus minor*, E. Simon det.), Golfo Aranci, April 1903, A. Dodero (MSNG); 1 ♀ (together with 1 ♂ of *G. minor*), Golfo Aranci, 11 May 2000, R. Poggi; 1 ♂, 2 ♀, Monti, 23 May 1976, R. Poggi, under *Quercus* and *Cistus*; 1 ♂, Sassari, Caniga, 17 March 1984, G. Gardini. *Sardinia: Oristano Prov.*: 1 ♀ (*Garypus minor*, E. Simon det.), Santu Lussurgiu, February 1901, Lostia (MSNG); 1 ♀ (*Garypus minor*, E. Simon det.), Uras, 25 April 1902, A. Dodero (MSNG); 1 ♂, 2 ♀, Abbasanta, 5 February 1985, C. Meloni; 2 ♀, id., Losa, 300 m a.s.l., 14 December 1994, C. Meloni; 1 ♀, Bauladu, 1 March 1989, L. Fancello & P. Leo; 1 ♀, Asuni, 23 February 1990, P. Leo. *Sardinia: Nuoro Prov.*: 1 ♂, Baunei, near Perda Longa, 20 m a.s.l., [no date], C. Torti; 1 ♀, Borore, 400 m a.s.l., 24 March 1985, C. Meloni, under bark *Eucalyptus*; 1 ♀, Desulo, 1120 m a.s.l., 28 May 1974, L. Briganti, under *Quercus ilex*; 1 ♀, Gairo Marina, 16 May 1980, G. Gardini, near the sea; 3 ♂, 1 deutonymph, Gairo Marina, 14 June 1983, C. Torti, under *Pistacia lentiscus*; 2 ♂, Gairo Marina, 14 April 2009, C. Torti, under *Myrtus* near the sea; 1 ♂, Gairo Taquisara, Ussassai, 23 June 1983, C. Torti, *Quercus ilex* wood; 1 ♂, 1 ♀, Gairo Cardedu, 26 June 1984, C. Torti, *Quercus ilex* wood; 1 ♀, Ierzu, Sant'Antonio, 27 June 1984, C. Torti, *Quercus ilex* wood on limestone; 1 ♀, Siniseola, slope S Monte Albo, 4 April 1997, S. Vit, *Quercus ilex* wood; 1 ♂, Lula, Foresta Demaniale Monte Altudè, 270 m a.s.l., 12 April 2012, C. Torti; 1 ♂, 1 ♀, Perdasdefogu, 18 June 1983, C. Torti, *Quercus ilex* wood; 1 ♂, 3 ♀, Santa Caterina di Pittinuri, Cuglieri, 24 May 1980, I. Marcellino; 2 ♀, Tertenia, Barisoni, 6 November 1992, C. Meloni, under *Pistacia lentiscus*. *Sardinia: Cagliari Prov.*: 2 ♂, 7 ♀ (*Garypus minor*, E. Simon det.), Cagliari, [no date], A. Dodero (MSNG); 1 ♂, Cagliari, Cala Regina, 15 March 1989, L. Fancello & P. Leo; 2 ♀, Cagliari, Cala Regina, 19 March 1995, L. Fancello; 3 ♂, 1 ♀ (*Garypus minor*, E. Simon det.), Carloforte, 20 May 1901, A. Dodero (MSNG); 1 ♂, Isola Sant'Antioco, Cala Lunga, 11 February 1984, L. Fancello & P. Leo; 1 ♀ (*Garypus minor*, E. Simon det.), Flumentorgiu, [no date], F. Solari (MSNG); 1 ♂, 1 ♀ (*Garypus minor*, E. Simon det.), Flumentorgiu, May 1897, F. Solari (MSNG); 1 ♂, 1 tritonymph, Arbus, Marina di Arbus, 14 April 1980, I. Marcellino; 7 ♂, 7 ♀, Arbus, Marina di Arbus, 2 November 1980, I. Marcellino; 1 ♂, Capoterra, 27 February 2003, L. Fancello; 3 ♀, Carbonia, Perdaxius, 6 May 2009, L. Fancello; 1 ♂, 2 ♀, Chia, 21 May 1994, C. Meloni; 1 ♂, 1 ♀, Chia, 14 May 1995, C. Meloni, under *Pistacia lentiscus*; 4 ♂, 15 ♀, Decimomannu, 19.IV.1995, C. Meloni, under *Olea europaea*; 1 ♂, 1 ♀, Domus de Maria, Cala de sa Musica, 45 m a.s.l., December 2008, G. Ruzzante; 2 ♂, 1 ♀, 1 tritonymph, Domus de Maria, Punta su Pisu, 19 m a.s.l., December 2006, G. Ruzzante; 15 ♂, 7 ♀, 4 tritonymphs, 1 deutonymph, Domus de Maria, Punta su Pisu, 19 m a.s.l., 15,30 September 2007, G. Ruzzante; 1 ♂, 1 ♀, Domus de Maria, Punta su Pisu, 19 m a.s.l., December 2007, G. Ruzzante; 11 ♂, 12 ♀, 13 tritonymphs, Domus de Maria, Punta su Pisu, 19 m a.s.l., September/November 2008, G. Ruzzante, dried faggot; 15 ♂, 7 ♀, 2 tritonymphs, 1 deutonymph, Domus de Maria, Punta su Pisu, 19 m a.s.l., September/November 2009, G. Ruzzante, dried faggot; 1 ♀, 2 tritonymphs, Domus de Maria, Punta su Pisu, 19 m a.s.l., 13

August 2011, G. Ruzzante; 1 tritonymph, Fluminimaggiore, Is Arenas, 29 March 1991, G. Gardini, *Quercus ilex* wood; 2 ♀, Fluminimaggiore, Perd'e Fogu, 2 April 1995, C. Meloni, under *Olea europaea*; 5 ♂, 5 ♀, 7 tritonymphs, near Fluminimaggiore, 2 April 1997, S. Vit; 1 ♀, Guspini, Sedda Orbadas, 200 m a.s.l., 9 April 1995, C. Meloni; 1 ♂, 2 ♀, 2 tritonymphs, Iglesias, Tempio di Antas, 29 March 1991, G. Gardini, *Quercus ilex* wood; 1 tritonymph, Muravera, Monte Narba, 600 m a.s.l., 30 March 1997, S. Vit; 1 ♀, Nuxis, Tattinu, 825 m a.s.l., 13 April 2014, C. Torti, under *Pistacia lentiscus*; 5 ♂, 12 ♀, Pabillonis, October 1983, P. Leo; 4 ♂, 3 ♀, Pula, 16 April 2012, L. Fancello; 1 ♂, 3 ♀, Sarroch, 6 April 1995, C. Meloni, under *Olea europaea*; 2 ♂, 5 ♀, Sarroch, Bacch'e Linna, 4 April 2010, L. Fancello; 9 ♂, 13 ♀, 4 tritonymphs, Serrenti, Gutturu Marongiu, 14 February 1995, C. Meloni; 3 ♂, 3 ♀, Siliqua, Monte Vannena, 60 m a.s.l., 9 October 1994, C. Meloni, under *Olea europaea*; 1 ♀, Sinnai, Corongiu, 4 January 1996, P. Leo; 1 ♂, near Teulada, 200 m a.s.l., 13 April 1980, I. Marcellino; 1 ♂, Villa San Pietro, 6 April 1995, C. Meloni, under *Olea europaea*; 3 ♀, Villamasargia, 31 March 1995, C. Meloni, under *Olea europaea*; 3 ♂, 3 ♀, Sant'Antioco, Isola il Toro, 14 June 1989, R. Poggi, under *Ecballium*; 1 ♂, 1 ♀, Sant'Antioco, 14 June 1989, G. Osella; 1 ♂, Sant'Antioco, Isola la Vacca, 14 June 1989, G. Osella.

**Diagnosis.**—A species of *Geogarypus* that differs from other extant and fossil species of the genus in the following combination of characters: carapace brown, uniformly coloured, legs not banded; tergites undivided, most sternites divided by a median thin suture, pseudotactile setae absent; vestitural setae not clavate; legs diplotarsate; galea of male simple and acuminate, of female with 9 distal rami; pedipalps often grey-dark; paraxial margin of pedipalpal hand noticeably swollen; pedipalpal femur and patella strongly wrinkled; fixed and movable chelal fingers respectively with 8 and 4 trichobothria; trichobothrium *it* mostly halfway between *et* and *ist*, *est* mostly closer to *isb* than *ib*, trichobothrium *st* closer to *sb* than *t*; fixed chelal finger homodontate, without or with 1 to 9 paraxial additional teeth on the distal half; 1 pit-like structure (*pls*) at level of trichobothria *est-esb*; venom ducts long, nodus ramosus respectively distad of *est* and *st*; length of pedipalpal femur 0.48–0.61 (♂), 0.56–0.74 (♀) mm, length of chela with pedicel 0.78–1.0 (♂), 0.94–1.20 (♀) mm.

**Description (adults).**—Integument strongly pigmented, carapace and pedipalps (fingers excepted) with star-like hispid granulation and small investing setae apically slightly sigmoid; carapace uniformly dark-brown, sometimes blackish; tergites dark-brown, I–II with a darker area on each extremity and one in the middle, III with a wide lighter medial area, IV–VIII with a thin whitish area in the middle; sternites II–III mostly whitish, IV–VIII uncoloured in the middle; pedipalps dark-brown or blackish; legs uniformly brown pale; pleural membrane longitudinally wrinkled-plicate, with transverse series of investing microsetae. Carapace (Fig. 25) 0.85–1.1 times as long as broad, subtriangular, with notch on anterior margin; anterior margin with 4 setae, the lateral longer and thicker than the medial ones; posterior margin with 12–16 setae; anterior furrow nearer the posterior eyes than the posterior margin of carapace, posterior basal furrow nearly indistinct; ocular area as in Fig. 25, diameter of eyes 0.04–0.055 mm; ratio of cucullus/carapace length 0.27–0.34.

Chaetotaxy of tergites I–XII: 12–15: 11–14: 12–14: 10–14: 12–15: 12–16: 13–16: 12–15: 13–15: 10–13: 10–13: 2. Chaetotaxy of sternites II–XII: ♂, 7–9: (1)14–15(1): (1)14–16(1): 17–21: 15–17: 14–15: 12–14: 8–9: 6–7: 2: 0; ♀, 8–9: (1)8–9(1): (1)14–15(1): 18–21: 15–18: 13–14: 11–14: 9–10: 7–9: 2: 0; sternites II–IV with setae, spiracles and tracheae of ♂ and ♀ respectively in Figs. 26 and 27; genitalia of ♂ and ♀ respectively in Figs. 28 and 29; genital atrium of ♂ with 2+2 setae. Chelicerae (Figs. 30–32) 2.0–2.4 (♂), 1.9–2.1 (♀) times as long as broad, palm with 5 setae, *bs* shorter and thicker than others; fixed finger with 4–6 teeth; movable finger with 3–5 subapical reduced teeth with rounded tips, *gs* subapical; galea simple, acuminate in ♂ (Fig. 31), with 9 apical rami in ♀ (Fig. 32); rallum with one aspinose blade; serrula interior with 12, exterior with 15 blades, the two proximal blades sickle-shaped, the distal one acuminate and stretched forward (Fig. 31). Coxal area (Fig. 33): manducatory process with 3 setae, the lateral one shorter; pedipalpal coxa with 11–19 setae (the antero-lateral one, on maxillary shoulder, very long) and two circular lyrifissures (*mml* and *pml*); chaetotaxy of coxae I–IV: I 5–7, II 6–9, III 10–16 (mostly 12–13), IV 18–23; coxae III–IV without granulation, lyrifissures as in Fig. 33. Pedipalp: trochanter (Figs. 34–35) 1.25–1.45 times as long as broad, with a ventral rounded apophysis; femur (Fig. 34) 3.1–3.45 times as long as broad, with short pedicel; patella (Fig. 34) 2.3–2.6 times as long as broad; chela with pedicel (Figs. 36–37) 3.3–3.85 (♂), 3.1–3.7 (♀) times as long as broad, 3.85–4.55 (♂), 3.5–4.2 (♀) times as long as deep; hand of chela with pedicel 1.4–2.0 (♂), 1.45–1.9 (♀) times as long as broad, 1.6–2.35 (♂), 1.65–2.1 (♀) times as long as deep; paraxial profile of pedipalpal hand, in dorsal view, noticeably swollen; fixed and movable fingers respectively with 8 and 4 trichobothria (Fig. 37), trichobothrium *it* mostly halfway between *et* and *ist* (rarely *it* closer to *et* than *ist*; Fig. 37), *est* mostly closer to *isb* than *ib*; dorsal surface of fixed chelal finger granulated as far as trichobothria *isb-est*; fixed chelal finger with 32–39 teeth with dental canals, homodontate, acuminate and anteriorly curved in the distal half of the finger, gradually reduced in size towards the finger base (Fig. 37); fixed finger without paraxial additional teeth in Ligurian specimens (Figs. 48–49) and in few specimens from Latium (Circeo), Calabria (Delianuova) and from many Sicilian localities (rarely with additional teeth on the other palpal chela or, a few, together with specimens bearing additional teeth); specimens from central and southern Italy, Sicily and Sardinia mostly with 1–3 (rarely 4–5) paraxial additional teeth—with dental canals—on the distal half of fixed chelal finger, mostly at level respectively of 9<sup>th</sup>, 12<sup>th</sup> and 15<sup>th</sup> distal serial teeth (Figs. 50–51); 1 pit-like structure (*pls*) between trichobothria *est-esb* (Fig. 37); venom ducts long, nodus ramosus respectively distad of *est* and *st*; movable chelal finger with 21–28 teeth with dental canals, distal half of movable finger with 10–12 triangular, acuminate teeth, proximal half with flat teeth gradually reduced in size, reaching back to *b*; trichobothrium *st* closer to *sb* than *t*; ratio of movable finger/hand of chela with pedicel 1.0–1.4 (♂), 1.0–1.2 (♀); ratio of pedipalpal femur/movable finger 1.05–1.2 (♂ ♀); ratio of pedipalpal femur/carapace 0.9–1.1 (♂), 0.9–1.0 (♀). Leg I (Fig. 38): trochanter 1.1–1.35, femur 2.4–3.15, patella 1.2–1.7, tibia 2.15–2.9, metatarsus 1.8–2.5, tarsus 3.1–4.0 times as long as deep; claws smooth and shorter than



arolium. Leg IV (Fig. 39): trochanter 1.4–1.7, femur 1.1–1.55, patella 2.35–2.9, tibia 3.4–4.25, metatarsus 2.5–3.2, tarsus 2.65–4.3 times as long as deep; claws smooth and shorter than arolium.

Measurements (in mm). Body length 1.45–1.9 (♂), 1.65–2.3 (♀). Carapace 0.53–0.65 × 0.52–0.67 (♂), 0.58–0.75 × 0.63–0.78 (♀), cucullus length (from anterior eyes) 0.15–0.19 (♂), 0.16–0.23 (♀). Chelicerae 0.15–0.18 × 0.07–0.11 (♂), 0.16–0.21 × 0.08–0.12 (♀), movable finger length 0.10–0.115 (♂), 0.10–0.14 (♀). Pedipalp: trochanter 0.22–0.28 × 0.16–0.20 (♂), 0.24–0.34 × 0.17–0.24 (♀); femur 0.48–0.61 × 0.15–0.195 (♂), 0.56–0.74 × 0.17–0.225 (♀); patella 0.345–0.42 × 0.135–0.18 (♂), 0.39–0.51 × 0.15–0.21 (♀); chela (with pedicel) 0.78–1.0 × 0.23–0.30 (♂), 0.94–1.20 × 0.27–0.39 (♀); chela (without pedicel) length 0.76–0.97 (♂), 0.91–1.16 (♀); chela depth 0.20–0.26 (♂), 0.25–0.34 (♀); hand length (with pedicel) 0.35–0.50 (♂), 0.42–0.57 (♀); hand length (without pedicel) 0.33–0.46 (♂), 0.39–0.53 (♀); movable finger length 0.44–0.58 (♂), 0.51–0.68 (♀). Leg I: trochanter 0.10–0.13 × 0.08–0.10 (♂), 0.11–0.16 × 0.08–0.13 (♀); femur 0.19–0.255 × 0.06–0.095 (♂), 0.18–0.29 × 0.07–0.11 (♀); patella 0.10–0.125 × 0.07–0.085 (♂), 0.11–0.145 × 0.08–0.11 (♀); tibia 0.13–0.19 × 0.05–0.065 (♂), 0.15–0.23 × 0.06–0.08 (♀); metatarsus 0.09–0.125 × 0.04–0.05 (♂), 0.09–0.135 × 0.05–0.06 (♀); tarsus 0.11–0.13 × 0.03–0.04 (♂), 0.10–0.17 × 0.03–0.045 (♀). Leg IV: trochanter 0.16–0.20 × 0.095–0.13 (♂), 0.18–0.25 × 0.115–0.155 (♀); femur 0.09–0.13 × 0.07–0.10 (♂), 0.11–0.16 × 0.08–0.12 (♀); patella 0.30–0.39 × 0.11–0.165 (♂), 0.31–0.455 × 0.11–0.18 (♀); tibia 0.25–0.34 × 0.07–0.095 (♂), 0.26–0.41 × 0.07–0.11 (♀); metatarsus 0.14–0.17 × 0.05–0.065 (♂), 0.14–0.20 × 0.05–0.08 (♀); tarsus 0.12–0.16 × 0.04–0.05 (♂), 0.13–0.17 × 0.04–0.06 (♀).

**Description (tritonymph).**—Carapace and pedipalps with weak pigmentation and granulation. Carapace 0.9–1.0 times as long as broad, furrows, anterior setae and ocular area as in adults; posterior margin with 9–11 (mostly 10) setae; diameter of anterior and posterior eyes 0.03–0.04 mm; ratio of cucullus/carapace length 0.28–0.32. Chaetotaxy of tergites I–XII: 9–11: 9–10: 9–10: 9–10: 9–10: 9–11: 9–11: 9–10: 10: 7–9: 6–8: 2. Chaetotaxy of sternites II–XII: 2: (1)4–6(1): (1)6–11(1): 10–15: 9–12: 9–11: 8–10: 6–7: 6–7: 2: 0. Chelicerae 1.85–2.0 times as long as broad, palm with 5 setae; fixed finger with 5–6 teeth; movable finger with 3–4 subapical reduced teeth with rounded tips, *gs* subapical; galea with 7 apical rami; rallum with one aspinose blade; serrula exterior with 12–13 blades, shape of proximal and distal blades as in adult. Coxal area: manducatory process with 3 setae, the lateral one shorter; pedipalpal coxa with 10–16 setae (the antero-lateral one very long) and two circular lyrifissures (*mml* and *pml*); chaetotaxy of coxae I–IV: I 3–4, II 3–5, III 7–9, IV 12–15. Pedipalp: trochanter 1.3–1.4 times as long as broad, with a ventral rounded apophysis; femur 3.05–3.55 times as long as broad, with a short pedicel; patella 2.15–2.6 times as long as broad; chela with pedicel (Figs. 40–41) 3.5–3.95 times as long as broad, 4.05–4.1 times as long as deep; hand of chela with pedicel 1.7–1.95 times as long as broad, 2.0–2.1 times as long as deep; fixed and movable fingers respectively with 7 and 3 trichobothria (Fig. 41), *isb* and *sb* absent; dorsal surface of fixed chelal finger granulated as far as trichobothrium *est*; fixed chelal finger with 28–34 teeth

with dental canals and 1–2 basal microtubercles; distal half of fixed chelal finger with acuminate, anteriorly slightly curved teeth; proximal half of fixed chelal finger with triangular teeth gradually rounded and reduced in size towards the finger base (Fig. 41), mostly with 2 paraxial additional teeth—with dental canals—on the distal half, rarely without additional teeth (Ligurian specimens); 1 pit-like structure (*pls*) at level of trichobothrium *est* (Fig. 41); venom ducts long, nodus ramosus respectively at level of *est* and distad of *st*; movable chelal finger with 22–28 teeth with dental canals, distal third of movable finger with 7–10 triangular, acuminated teeth and, proximad of trichobothrium *t*, with flat teeth gradually reduced in size, reaching back to *st-b*; ratio of movable finger/hand of chela with pedicel 1.1–1.2; ratio of pedipalpal femur/movable finger 1.0–1.1; ratio of pedipalpal femur/carapace 0.9–0.95. Leg I: trochanter 1.1–1.5, femur 2.5–3.0, patella 1.3–1.65, tibia 2.0–2.4, metatarsus+tarsus 3.6–4.5 times as long as deep; claws smooth and shorter than arolium. Leg IV: trochanter 1.3–1.6, femur 1.3–1.5, patella 2.6–3.1, tibia 3.3–3.65, metatarsus 2.2–2.6, tarsus 2.75–3.6 times as long as deep; claws smooth and shorter than arolium.

Measurements (in mm). Body length 1.4–1.8. Carapace 0.46–0.53 × 0.46–0.54, cucullus length (from anterior eyes) 0.13–0.15. Chelicerae 0.13–0.15 × 0.07–0.08, movable finger length 0.07–0.09. Pedipalp: trochanter 0.17–0.21 × 0.12–0.15; femur 0.43–0.50 × 0.13–0.15; patella 0.29–0.34 × 0.12–0.14; chela (with pedicel) 0.74–0.85 × 0.19–0.22; chela (without pedicel) length 0.71–0.82; chela depth 0.18–0.21; hand length (with pedicel) 0.37–0.42; hand length (without pedicel) 0.34–0.39; movable finger length 0.40–0.46. Leg I: trochanter 0.09–0.11 × 0.06–0.08; femur 0.15–0.16 × 0.05–0.06; patella 0.09–0.10 × 0.06–0.07; tibia 0.12–0.14 × 0.05–0.06; metatarsus + tarsus 0.16–0.18 × 0.04–0.05. Leg IV: trochanter 0.13–0.16 × 0.08–0.10; femur 0.10–0.11 × 0.07–0.075; patella 0.25–0.27 × 0.08–0.10; tibia 0.20–0.23 × 0.06–0.07; metatarsus 0.10–0.13 × 0.04–0.05; tarsus 0.10–0.12 × 0.03–0.04.

**Description (deutonymph).**—Carapace and pedipalps with weak pigmentation and granulation. Carapace 1.0 time as long as broad, anterior setae and ocular area as in adults, furrows nearly indistinct; posterior margin with 6–8 setae; diameter of anterior eyes 0.03 mm, posterior eyes 0.03–0.04 mm; ratio of cucullus/carapace length 0.25–0.30. Chaetotaxy of tergites I–XII: 6–7: 6–7: 5–7: 6–7: 6–7: 5–7: 6–7: 6: 6: 6: 4–5: 2. Chaetotaxy of sternites II–XII: 0: (1)3–5(1): (1)5–6(1): 5–7: 6–7: 6–7: 6–7: 4–5: 4: 20. Chelicerae 1.7–2.15 times as long as broad, palm with 5 setae; fixed finger with 4–5 teeth; movable finger with 3–4 subapical reduced teeth with rounded tips, *gs* subapical; galea with 5 apical rami; rallum with one aspinose blade; serrula exterior with 11 blades, shape of proximal and distal blades as in adult. Coxal area: manducatory process with 3 setae, the lateral one shorter; pedipalpal coxa with 7–10 setae (the antero-lateral one very long) and two circular lyrifissures (*mml* and *pml*); chaetotaxy of coxae I–IV: I 2, II 3, III 4, IV 7. Pedipalp: trochanter 1.35–1.55 times as long as broad, with a ventral rounded apophysis; femur 3.1–3.5 times as long as broad, with a short pedicel; patella 2.2–2.55 times as long as broad; chela with pedicel (Figs. 42–43) 3.8–4.2 times as long as broad, 4.3–4.35 times as long as deep; hand of chela with pedicel 1.9–2.0

times as long as broad, 2.05–2.2 times as long as deep; fixed and movable fingers respectively with 6 and 2 trichobothria (Fig. 43), *isb*, *esb* and *st*, *sb* absent; dorsal surface of fixed chelal finger granulated as far as trichobothrium *est*; fixed chelal finger with 26–28 teeth with dental canals and 1–2 basal microtubercles; distal half of fixed chelal finger with acuminate teeth; proximal half with triangular teeth gradually rounded and reduced in size towards the finger base (Fig. 43), mostly with 1 paraxial additional tooth—with dental canal—on the distal half, rarely without additional tooth (Ligurian specimens); 1 pit-like structure (*pls*) distad of trichobothrium *est* (Fig. 43); venom ducts long, nodus ramosus respectively distad of *est* and halfway between *t*–*b*; movable chelal finger with 22–24 teeth with dental canals, distal third of movable finger with 7–11 triangular, acuminate teeth and, proximad of trichobothrium *t*, with flat teeth gradually reduced in size, reaching back to *b*; ratio of movable finger/hand of chela with pedicel 1.0–1.2; ratio of pedipalpal femur/movable finger 0.9–1.05, ratio of pedipalpal femur/carapace 0.8–0.9. Leg I: trochanter 1.3–1.5, femur 2.2–2.6, patella 1.3–1.6, tibia 1.8–2.5, metatarsus+tarsus 3.75–5.0 times as long as deep; claws smooth and shorter than arolium. Leg IV: trochanter 1.55, femur 1.3–1.8, patella 2.5–2.85, tibia 2.8–3.4, metatarsus 1.8–2.25, tarsus 2.5–3.3 times as long as deep; claws smooth and shorter than arolium.

Measurements (in mm). Body length 1.1–1.2. Carapace 0.39–0.43 × 0.38–0.43, cucullus length (from anterior eyes) 0.10–0.12. Chelicerae 0.12–0.13 × 0.06–0.07, movable finger length 0.07. Pedipalp: trochanter 0.15–0.17 × 0.10–0.11; femur 0.33–0.35 × 0.10–0.11; patella 0.22–0.24 × 0.09–0.10; chela (with pedicel) 0.61–0.65 × 0.15–0.17; chela (without pedicel) length 0.59–0.63; chela depth 0.14–0.15; hand length (with pedicel) 0.29–0.33; hand length (without pedicel) 0.27–0.31; movable finger length 0.32–0.38. Leg I: trochanter 0.08–0.09 × 0.06; femur 0.11–0.13 × 0.05; patella 0.07–0.08 × 0.05–0.06; tibia 0.09–0.10 × 0.04–0.05; metatarsus + tarsus 0.14–0.15 × 0.03–0.04. Leg IV: trochanter 0.11 × 0.07; femur 0.08–0.09 × 0.05–0.06; patella 0.18–0.20 × 0.07–0.08; tibia 0.15–0.17 × 0.05–0.06; metatarsus 0.08–0.09 × 0.04–0.05; tarsus 0.09–0.10 × 0.03–0.04.

**Description (protonymph).**—Carapace and pedipalps withish, with weak granulation. Carapace 0.85–1.0 times as long as broad, anterior setae and ocular area as in adults, furrows indistinct; posterior margin with 4 setae; diameter of anterior and posterior eyes 0.03 mm; ratio of cucullus/carapace length 0.22–0.28. Tergites I–XI with 4 (rarely 3) setae, tergite XII 2. Chaetotaxy of sternites II–XII: 0: (0)2(0): (1)2(1): 4: 4: 4: 4: 4: 2: 0; Chelicerae 1.75–2.0 times as long as broad, palm with 4 setae, *sbs* absent; fixed finger with 4–5 teeth; movable finger with 3–4 subapical reduced teeth with rounded tips, *gs* absent; galea with 3 apical rami; rallum with one aspinose blade; serrula exterior with 10–11 blades, proximal and distal blades as in adult. Coxal area: mandueatory process with 2 setae (lateral seta absent); pedipalpal coxa with 3 setae (the anterior very long) and one circular lyrifissure (*mmf*); chaetotaxy of coxae I–IV: 1. Pedipalp: trochanter 1.2–1.5 times as long as broad, with a ventral rounded apophysis; femur 2.7–3.5 times as long as broad, with a short pedicel; patella 2.0–2.7 times as long as broad; chela with pedicel (Figs. 44–45) 3.8–4.2 times as long as broad, 4.3 times as long as deep; hand of chela with pedicel 1.9–2.1 times as long as

broad, 2.2 times as long as deep; fixed and movable fingers respectively with 3 and 1 trichobothria (Fig. 45), *it*, *est*, *isb*, *ib*, *esb* and *st*, *sb*, *b* absent; dorsal surface of fixed chelal finger slightly granulated as far as trichobothrium *eb*; fixed chelal finger with 19–24 teeth with dental canals and 3–5 basal microtubercles; distal half of fixed chelal finger with acuminate teeth; proximal half with triangular and rounded teeth gradually reduced in size towards trichobothrium *eb* (Fig. 45); additional teeth absent; 1 pit-like structure (*pls*) at level of trichobothrium *ist* (Fig. 45); venom ducts long, nodus ramosus respectively proximad of *ist* and proximad of *t*; movable chelal finger with 15–20 teeth with dental canals, distal third of movable finger with 6–8 triangular, acuminate teeth, proximally with flat teeth gradually reduced in size; ratio of movable finger/hand of chela with pedicel 1.0–1.15; ratio of pedipalpal femur/movable finger 0.95–1.05, ratio of pedipalpal femur/carapace 0.8–1.0. Leg I: trochanter 1.2–1.4, femur 2.4–3.3, patella 1.2–1.5, tibia 2.0–2.25, metatarsus+tarsus 3.3–4.0 times as long as deep; claws smooth and shorter than arolium. Leg IV: trochanter 1.3–1.65, femur 1.4–1.75, patella 2.0–2.8, tibia 2.4–3.2, metatarsus 1.5–1.75, tarsus 2.3–3.0 times as long as deep; claws smooth and shorter than arolium.

Measurements (in mm). Body length 0.85–1.0. Carapace 0.27–0.34 × 0.32–0.38, cucullus length (from anterior eyes) 0.07–0.09. Chelicerae 0.10–0.11 × 0.05–0.06, movable finger length 0.05–0.06. Pedipalp: trochanter 0.11–0.13 × 0.08–0.09; femur 0.27–0.28 × 0.08–0.11; patella 0.16–0.20 × 0.07–0.08; chela (with pedicel) 0.49–0.55 × 0.12–0.14; chela (without pedicel) length 0.47–0.53; chela depth 0.125; hand length (with pedicel) 0.23–0.27; hand length (without pedicel) 0.21–0.25; movable finger length 0.26–0.29. Leg I: trochanter 0.06–0.07 × 0.05; femur 0.10–0.12 × 0.03–0.05; patella 0.05–0.06 × 0.04–0.05; tibia 0.08–0.09 × 0.04; metatarsus + tarsus 0.10–0.12 × 0.03. Leg IV: trochanter 0.08–0.10 × 0.05–0.06; femur 0.07 × 0.04–0.05; patella 0.14–0.17 × 0.06–0.07; tibia 0.12–0.14 × 0.04–0.05; metatarsus 0.06–0.07 × 0.04; tarsus 0.07–0.09 × 0.03.

**Distribution.**—*Geogarypus italicus* has been recorded from the following regions of Italy (Fig. 55): Liguria, Tuscany, Latium, Abruzzo, Campania, Basilicata, Apulia, Calabria, Sicily, and Sardinia.

**Remarks.**—*Geogarypus italicus* shares with *G. minor*, a widespread species in the Mediterraneo-Macaronesian area, the same distribution in mainland Italy, Sicily and Sardinia, often with syntopic populations (Figs. 54–55). The presence of *G. italicus*, a species with a palpal femur with evident wrinkles, together with *G. minor* probably contributed to perpetuate the error of Simon (1879) in interpreting both *G. minor* and *G. nigrimanus* (see Remarks under *G. minor*).

The high variability of *G. minor* from Giglio Island (Tuscany) emphasized by Ellingsen (1908) is due to the presence on that island of both *G. minor* and *G. italicus*, in MSNG mixed in the same vials (see above under Other material examined). Consequently, many Italian records of *G. minor* (Gardini 2000) remain to be verified.

The relationships of *G. italicus* within the Mediterraneo-Macaronesian *Geogarypus* fauna are uncertain, but morphological comparisons are outlined in the proposed key.

**Etymology.**—The name refers to the geographical provenance of the examined specimens.

KEY TO ADULTS OF THE MEDITERRANEO-MACARONESIAN SPECIES OF *GEOGARYPUS*

1. Galea conical, acuminate in male, apically indented or slightly bifurcate in female; distal half of fixed chelal finger with 1–3 anti-axial additional (“accessory”) teeth; pedipalpal femur and patella always without wrinkles; carapace two-coloured, uniformly brown or red-brown distad the anterior furrow, with a median dark area and two lateral pale ones proximad the anterior furrow ..... 2
  - Galea conical, acuminate in male, with 9 (rarely 8) apical rami in female; fixed chelal finger without or with 1–15 paraxial additional (“accessory”) teeth; pedipalpal femur and patella without or with wrinkles; carapace uniformly brown or red-brown ..... 4
2. Trichobothrium *st* closer to *t* than *sb*; different coloured areas of carapace less contrasted, gradually faded each others; pedipalps (♀) more slender: femur 4.0–4.8, patella 3.2–3.7, chela with pedicel 3.9–4.7 times as long as broad ..... 3
  - Trichobothrium *st* closer to *sb* than *t*; different coloured areas of carapace more contrasted, clearly separated each others; pedipalps (♀) less slender: femur 3.9, patella 3.0, chela 3.6 times as long as broad (Israel) ..... *G. pulcher* Beier, 1963
3. Smaller: length of pedipalpal femur 0.76 (♂), 0.75–0.85 (♀), patella 0.55 (♂), 0.56–0.62 (♀), chela with pedicel 1.24 (♂), 1.22–1.34 (♀), hand with pedicel 0.56 (♂), 0.52–0.63 (♀), finger 0.70 (♂), 0.69–0.75 (♀) mm [Chad; introduced to Gran Canaria Isl (Mahnert 2011)] ..... *G. mirei* Heurtault, 1970
  - Larger: length of pedipalpal femur 0.85–0.92 (♂), 0.85–1.0 (♀), patella 0.60–0.68 (♂), 0.62–0.78 (♀), chela with pedicel 1.32 (♂), 1.40–1.41 (♀), hand with pedicel 0.62–0.71 (♂) 0.68–0.78 (♀), finger 0.72–0.81 (♂), 0.74–0.90 (♀) mm (Greece, Turkey, Israel, Iran, Turkmenistan) ..... *G. shulovi* Beier, 1963
4. Pedipalpal femur mostly without wrinkles (Fig. 13), rarely weakly wrinkled; fixed chelal finger heterodentate (teeth irregularly aligned, distal half of finger with one long tooth alternate with two-three shorter teeth: Figs. 16, 20), with 3–15 paraxial additional teeth ..... 5
  - Pedipalpal femur strongly wrinkled (Fig. 34); fixed chelal finger homodentate (teeth regularly aligned and decreasing in size proximally: Fig. 37, 41), without or with 1–9 paraxial additional teeth on the distal half (Figs. 48–51) (Italy) ..... *G. italicus* sp. nov.
5. Pedipalpal hand, in dorsal view, with irregular outline at the base of fingers; fixed chelal finger with 30–36 teeth with dental canals; smaller: length of pedipalpal femur 0.45–0.62 (♂) 0.53–0.82 (♀), patella 0.35–0.45 (♂), 0.38–0.62 (♀), chela with pedicel 0.75–0.94 (♂), 0.80–1.33 (♀), hand with pedicel 0.32–0.44 (♂), 0.39–0.60 (♀), finger 0.44–0.53 (♂) 0.47–0.76 (♀) mm ..... 6
  - Pedipalpal hand, in dorsal view, oval, with regular outline at the base of fingers; fixed chelal finger with 38–45 teeth with dental canals; larger: length of pedipalpal femur 0.69–0.72 (♂), 0.80–0.84 (♀), patella 0.51–0.54 (♂), 0.545–0.64 (♀), chela with pedicel 1.14–1.15 (♂) 1.25–1.40 (♀), hand with pedicel 0.53–0.54 (♂) 0.58–0.68 (♀), finger 0.65–0.66 (♂), 0.71–0.75 (♀) mm (Morocco) ..... *G. maroccanus* Beier, 1961
6. Paraxial surface of pedipalpal hand with a weak rounded hump at the base of fixed finger (Fig. 15); fixed chelal finger with 4–9 paraxial additional (“accessory”) teeth mostly on its proximal half (Figs. 16, 46–47) (Algeria, Morocco, Portugal, Spain, France, Italy, Malta, Croatia, Albania, Greece, Turkey, Sudan (?)) ..... *G. minor* (L. Koch, 1873)
  - Paraxial-ventral surface of pedipalpal hand with a hollow at the base of movable finger; fixed chelal finger with 3–7 paraxial additional (“accessory”) teeth mostly on its distal half (Figs. 52–53) [Canary Islands (Tenerife)] ..... *G. canariensis* (Tullgren, 1900)

## DISCUSSION

Seven species of the genus *Geogarypus* are known from Mediterraneo-Macaronesian area. The above key is based on data from the original description of *G. pulcher* Beier, 1963—integrated with those from Mahnert (1974)—and from the redescription of *G. maroccanus* Beier, 1961 by Callaini (1988). Descriptions of *G. shulovi* Beier, 1963 are integrated with data from Beier (1965) and those of both *G. shulovi* and *G. mirei* Heurtault, 1970 are integrated with examination of specimens listed above (see Methods).

*Geogarypus canariensis* was described (as *Garypus canariensis*) from Tenerife, Barranco de Ruiz (Tullgren 1900). The female holotype of *G. canariensis* is untraceable and the redescriptions presented by Beier (1956) and Callaini (1988) on specimens from Morocco most likely represent other species. Since all of the studied specimens from Tenerife are morphologically homogeneous, they all are referred to *G. canariensis*, whereas the specimens from other Canarian islands—morphologically differentiated and to be reviewed

when more material is available—are provisionally referred to *G. cf. canariensis* and excluded from the above key.

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